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INDIANS AND SELECTIVE SERVICE

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The role of Indians in national defense is outstanding. During the last World War, Indians were not subject to military service, although they registered under the draft law to the extent of 17,513. In 1918 the Commissioner of Indian Affairs reported that more than 6,000 had enlisted in the military services. Similar response in the present emergency is exemplified by Indians of the Fort Peck, Montana, Agency, where almost 50 percent of the number eligible for selective service have already volunteered in the armed forces of the Nation. In Oklahoma, 30 Comanches were selected from many applicants to form a special detachment of the Signal Corps to use the Indian language for code purposes in communication. The Comanche language was chosen because it is little known and difficult to learn.

Material is not available to show the physical condition of Indians during the last World War.

Under the present Selective Service Act, practically 100 percent registration of Indians has been effected without difficulty. The following table shows eligible Indians.

TABLE 1.—*Estimated Indian male population under the jurisdiction of the Office of Indian Affairs and estimated number 21 to 35 years of age Jan. 1, 1940, by State, including Alaska*[1]

State	Estimated Indian male population	Number 21 to 35 years of age	State	Estimated Indian male population	Number 21 to 35 years of age
Total	199 518	41 899	Nevada	2 700	567
			New Mexico	19 308	4 055
Arizona	26 042	5 469	New York	3 516	738
California	11 780	2 474	North Carolina	1 818	382
Colorado	461	97	North Dakota	5 921	1 243
Florida	281	59	Oklahoma	51 600	10 836
Idaho	2 112	444	Oregon	2 607	547
Iowa	238	50	South Dakota	14 638	3 074
Kansas	1 087	228	Texas	166	35
Louisiana	58	12	Utah	1 140	239
Michigan	2 390	502	Washington	6 994	1 468
Minnesota	8 267	1 736	Wisconsin	6 401	1 344
Mississippi	1 006	211	Wyoming	1 207	253
Montana	8 586	1 803	Alaska	16 830	3 534
Nebraska	2 374	499			

[1] The male population is estimated as 50.6 percent of the total (394 280) and the age group 21 to 35, inclusive, as 21.0 percent of the male population (199 518).

A study has been made of reports submitted by a number of unselected Agencies giving data on registrants examined and rejected. A considerably larger number was reported, but, because of various factors, some elimination was necessary. These factors included incomplete reports, failure to give causes for rejection by individuals, and similar reasons. In some instances local boards declined to divulge the information. It is believed that a significant number is shown in table 2. Figures given are for examined men classified as not qualified for general military service (Class IV–F and Class IB) by local boards only. Army induction center rejection figures are not immediately available, although such rejections probably would eliminate an additional 10 percent of the selectees.

TABLE 2.—*Indians rejected on examination by local boards as not qualified for military service, by Agency, tribe, and cause*

Agency	Tribe	Examined	Rejected	Eye diseases	Tuberculosis	Venereal diseases	Nervous and mental diseases	Foot diseases	Defective teeth	Weight	Ear, nose, and throat	Cardiovascular	Genito-urinary	Varicose veins	Other
Total		1,575	591	124	79	70	67	39	33	31	30	25	9	5	79
Percent		100	37 51	7 86	5 01	4 44	4 25	2 47	2 10	1 96	1.90	1.58	0.57	0.32	5.01
Cherokee (N. C)	Cherokee	20	8			4	1	1		1				1	
Consolidated Chippewa (Minn)	Chippewa	40	20	4		2	4		6		1				3
Keshena (Wis)	Menominee	66	44	5	5	1	8	3	5			8			9
Sisseton (S. Dak.)	Sioux	58	21	7		2	8		1			1	1		1
Crow Creek (S Dak.)	do	13	8	1	3	1	2	1							
Rosebud (S Dak)	do	114	81	21	9	17	7	9	3	1		1	2	1	10
Cheyenne River (S Dak.)	do	41	20	4	6	1	2	2		1		3	1		
Standing Rock (N Dak.)	do	56	25	8	2		7		1			1	4		2
Fort Totten (N. Dak.)	do	28	17	3	2	4	1		2	1					4
Winnebago (Nebr.)	Omaha	22	5	1			3								1
Crow (Mont)	Crow	35	12	3			1		1	1	1	1			4
Fort Belknap (Mont)	Goshute	12	2	1											1
Rocky Boy (Mont)	Chip-Cree	25	5	3							1				1
Warm Springs (Oreg)	Mixed	17	6		3	1			1		1				
Pawnee (Okla.)	Miscellaneous	48	17		4	5	2	1	1	2	1	1			1
Osage (Okla)	do	73	30	2		8	7	1	3	4		1			4
Five Civilized Tribes (Okla)	do	108	52	4	3	7	9	10	2	4	3	2			8
Navajo (Ariz)	Navajo	520	157	47	33	15	1	7	4	11	17	4	1	1	16
Sells (Ariz)	Papago	32	13	2	2		2			2	1			1	2
San Carlos (Ariz)	Apache	35	5								2				3
Fort Apache (Ariz)	do	73	27	8	7			2	1	1	2	1			5
Mescalero (N. Mex)	do	8													
Mission (Calif.)	Miscellaneous	131	16			2	2	2	2	2		1		1	4

Estimate of rejected examinees generally under the Selective Service Law, as given by Britten and Perrott (*1*), was based on an analysis of examinations of 21,025 men classified as unfit for military service because of physical disability. For comparative purposes their listing of defects is modified to show conditions reported in the 591 Indians. Not all conditions found by them were reported as such among Indians and those conditions have, therefore, been grouped in the "all other" column. It must be emphasized that all figures given are for primary cause of rejection and should not be interpreted as prevalence of disease among the selectees.

TABLE 3.—*Comparative data on percent of causes for rejection by local boards for military duty among Indians and among all examined men*

	Indians	United States		Indians	United States
Total	37.51	32.00	6 Defective teeth	2.10	6.26
			7 Weight	1.96	1.05
1 Eye diseases	7.86	3.62	8 Ear-nose-throat	1.90	1.37
2 Tuberculosis	5.01	(1)	9 Cardio-vascular	1.58	3.03
3 Venereal diseases	4.44	1.13	10 Genito-urinary	0.57	0.62
4 Nervous and mental diseases	4.25	1.83	11 Varicose veins	0.32	0.35
5 Foot diseases	2.47	1.03	12 All other	5.01	11.68

[1] Listed in "all other"

The number of men in each age group who were examined is not available, so that full conclusions cannot be drawn, but as a matter of interest the distribution of rejections by cause of the 549 whose ages were reported is as follows:

TABLE 4

Age	Eyes	Tuberculosis	Venereal diseases	Nervous and mental diseases	Foot diseases	Defective teeth	Weight	Ear nose-throat	Cardio-vascular	Genito-urinary	Varicose veins	Other	Total
21	13	7	6	4	4	2	1	8	2	2	0	12	56
22	11	7	5	6	5	1	5	8	2	2	0	7	54
23	13	11	7	4	2	1	0	4	2	0	0	9	53
24	10	5	5	6	6	2	2	4	3	1	1	7	52
25	18	7	5	5	8	1	4	1	3	0	0	8	55
26	10	8	7	3	2	5	2	1	0	0	0	8	46
27	9	6	8	5	6	8	0	1	1	1	0	6	46
28	5	1	4	5	1	2	1	2	0	0	2	5	28
29	6	3	1	2	1	3	6	1	0	0	0	2	25
30	2	6	5	1	2	2	1	1	1	1	0	3	25
31	3	5	1	2	2	4	1	1	2	0	0	5	26
32	5	0	2	4	1	2	1	1	2	0	0	4	22
33	5	0	0	1	0	5	2	2	2	1	0	2	20
34	3	2	8	2	0	2	0	1	0	0	0	1	14
35	5	2	4	2	1	3	2	1	1	2	0	4	27

Tuberculosis.—Tuberculosis was not specifically given in Britten and Perrott's analysis, whereas it looms large in the figures for Indians, although it probably would not exceed that to be found in similar economic groups among the general population. Also, it is

probable that a considerably larger proportion of Indians had X-ray examination of the chest because of availability of facilities and a continuous educational campaign.

Venereal disease.—Occurrence of venereal disease (syphilis and gonorrhea) appears higher than for the general sample. The impression has prevailed that Indians had less venereal disease than the general population, although complete surveys have not been reported. Familiarity of Indian Service examining physicians with governmental records and general procedures and facilities for complete examination may account to some extent for reporting of more venereal disease as primary cause of rejection. It is expected that further studies will clarify many phases of the question of prevalence as well as major rejection causes.

Eye diseases.—Of the 124 men rejected because of eye defects, 58, or 46.7 percent, were reported as having trachoma. This reveals an incidence of trachoma among all examined Indians of 3.6 percent, which is somewhat lower than the estimate of the disease among the general Indian population. Examinations during the past year by special physicians of 70,710 Indians showed 9,260 cases (13 percent). However, they were selected cases and the occurrence therefore was much higher than among the Indian population in general. Elimination of trachomatous individuals from this study of premilitary examinations leaves the number rejected for other eye conditions approximately the same as reported by Britten and Perrott.

Nervous and mental diseases.—Rejections because of nervous and mental diseases show a surprisingly high total, as it has always been the impression of Indian Service officials that mental disease is not so common among Indians. The Service maintains no beds for mental patients in its 97 hospitals. There are only a few more than 200 Indians in various State mental institutions and in St. Elizabeths Hospital, drawn from a population of approximately 300,000. Infrequency of cerebrospinal syphilis has long been known. One possible partial explanation of the high rate of mental disease among registrants is a more thorough examination by Service physicians, and a lack of knowledge and understanding of the Indian personality by non-Service physicians.

Foot diseases.—No explanation can be made relative to the incidence of foot diseases, which appears to be twice that of the general group. It has been suggested that a study of similar low economic groups might show an equally high occurrence.

Defective teeth.—The relatively low incidence of defective teeth as a major cause for rejection among Indians presents an interesting situation. The group examined were not too long out of boarding and day schools, to which dental service is almost entirely limited, so that at least fair condition of the teeth might be expected. Pos-

sibly of more importance is the fact that practically all Indians reside west of the Mississippi in areas where water contains fluorine to a higher degree, which has been found to be concomitant with lessened dental caries. Further analysis of general Selective Service figures by States and smaller areas should clarify this possibility.

Attention is again directed to the fact that the above figures are for major causes of rejection and not an indication of prevalence of disease.

Although the numbers of Indians examined and rejected, as shown in this study, are comparatively small, the figures are statistically significant. They well demonstrate the necessity of giving serious consideration to rehabilitation and general physical welfare.

Efforts of the Indian Service Health Division have not, for obvious reasons, been principally directed to the Indian population affected by Selective Service. Health facilities are concerned with complete physical care, including domiciliary, public health, sanitation, and hospitalization of approximately 300,000 individuals. These facilities include the services of approximately 200 full-time and 175 part-time physicians, 800 hospital and public health nurses, and 1,300 other employees, 97 hospitals with about 5,000 beds, and numerous clinics and dispensaries scattered over 25 States and Alaska from Florida to the Arctic Circle.

Because of health education, and through necessity imposed by low economic status, Indians are availing themselves of services to an extent which almost overwhelms the organization. Sixty-four thousand patients were treated in hospitals and over a million out-patient treatments given in 1941. More than 80 percent of Indian babies were delivered by Service physicians. Special physicians are assigned to continuous mass surveys and case-finding in tuberculosis. Specialists also are making tremendous progress in treatment of trachoma since the introduction of sulfanilamide in the treatment of this disease by Loe of the Indian Service. In 70,000 examinations last year, 9,000 cases were found and about two-thirds were placed under treatment. The totally inadequate staff of 18 full-time dentists is unable to furnish more than partial dental care.

Venereal diseases among Indians vary with the proximity to white communities. These, with other defects, are treated as part of the local health program by Agency physicians. Routine general physical examinations, often including serology, and X-ray of the chest, are standard procedure in the Service, with most favorable corrective results in the more easily accessible groups, such as school children and Civilian Conservation Corps enrollees.

Expansion of health work and specific attention to rehabilitation of rejected selectees by the Indian Service is practically impossible with present personnel and funds. If additional funds are not provided it will be necessary for the various States to assume a larger portion of

the responsibility or the Indians must be included in any national program.

In many instances the Indian is not recognized as an integral part of the community by local, State, and Federal health and welfare organizations which are not directly aware of the immediate and complex nature of the problems besetting the existence of this racial minority. Until cognizance is taken of conditions actually existing which not only affect the Indians themselves but the surrounding communities as well, progress in the general public health field will continue to be retarded in those areas and States where Indians reside.

REFERENCE

(1) Britten, R H., and Perrott, George St J Causes of physical disqualification under the Selective Service law. Early indications. Pub. Health Rep, 56:1017 (May 9, 1941).

THE CODING AND TABULATION OF MEDICAL AND RESEARCH DATA FOR STATISTICAL ANALYSIS [1]

By THOMAS I. EDWARDS, *Statistician, United States Public Health Service*

Most of the conventional punch-card methods are applicable to large-scale statistical investigations in which there are relatively few variables and in which there is little need or opportunity to return to the original records after statistical work has begun. In research, on the other hand, it may be necessary to study the interrelationships of a relatively large number of variables in a comparatively small number of cases. Further, it may be advantageous for the investigator to return to his original records frequently whenever statistical analysis opens up new points of view. Moreover, if the intercorrelation of several sets of variables is to be studied it will be necessary to run the cards through the sorting machine or the tabulator many more times than when simple descriptive tables (like census data) are to be set up. A system of coding that may be workable for assembling simple tables may become burdensome or impracticable in setting up correlation tables and frequency distribution.

If the number of cases to be tabulated is small, the time required to build up tables by punch-card methods may be as great as the time required to obtain the same results by hand methods. Sometimes the suggestion is made that if no more than 500 cases are to be studied and if only simple tables are to be set up, it is quite as satisfactory to use hand methods as machine methods. The number of cases is not as important, in this connection, as the number of items that are to be correlated with each other. If a set of data contained 10 or 12 variables, most of which could be correlated with almost

[1] From the Division of Industrial Hygiene, National Institute of Health.

any one of the other variables, it would probably save time to transfer the data to punch cards even if there were less than a hundred cases.

If most of the data are nonquantitative, the use of perforated-margin punch cards should be considered.

When the number of case records is small, or when punch-card equipment is not available, it is a good plan to copy pertinent data by hand from the original records on sheets similar to the ones shown in figure 3. These sheets can be arranged, and labelled, so that each sheet or set of sheets contains information about individuals who are similar in certain specified respects. After these sheets have been set up, the data can be counted or averaged, and the counts or averages can be copied directly into tables. The first half of this paper describes the advantages of listing research data in this form and applies both to data listed by hand and to data listed by machine. If punch-card equipment is available it is possible for an investigator to save a good deal of time by using it. What is more important, it may enable him to try out many more statistical procedures and many more systems of classifying his data than he could undertake otherwise.

Installations of punch-card machinery are in use in many health departments and in many educational institutions. Where equipment is not available elsewhere it may be possible to make arrangements with the service bureaus maintained in many cities to do part or all of the operations described here.

The punch-card machinery required for the operations under discussion here are a card punch, sorting machine, and either a numerical or an alphabetic printing tabulator.

For the information of persons who may not be familiar with punch-card equipment, a card punch has 12 keys, numbered 0 to 9 and 11 and 12. The 11-key is usually referred to as "X" and the 12-key is variously called "V", "Y", or "B". Each key, when depressed, actuates mechanism which punches a hole in 1 of 12 positions in a numbered column of a special card. Each column is used for a specified kind of information.

A sorting machine draws cards, one at a time, from the bottom of a stack, reads the information in a single, designated column, and drops each card into 1 of 12 boxes according to the number punched in that column. Simultaneously, the number of cards dropped into each box is counted on numbered dials.

Tabulators will print all, or any selected part, of the information on a punch card on a sheet of paper. The portions of sheets shown in figure 3 were prepared in this way. Tabulating machines may also be made to carry out other operations: (*a*) Numerical information may be summed and the totals printed. (*b*) The tabulator may be made to count, for instance, only cards punched 2, 4, or 7 in a certain column, and to disregard all others. (*c*) The information coded in column 12, for instance, may be made to control the operations the tabulator will carry out on information punched in columns 39 and 40, for example. (*d*) A number punched in columns 69 and 70, for instance, may be multiplied by itself automatically by appropriate wiring of a printing tabulator and the square

added to the sum of squares of other numbers punched in the same two-column field. This forms the basis of an easy and rapid method of calculating standard deviations and other statistical measures. (*e*) Similarly, a number punched in columns 69 and 70 may be multiplied by a number punched in columns 11 and 12, for example, and the product added into counters set aside for the purpose. This greatly facilitates the calculation of correlation coefficients. The basic principle underlying these two operations is tersely explained in technical publications (*8,9*) whose wording may not suggest their usefulness unless special attention is called to them. (*f*) When the data describing one individual are so extensive that they cannot be gotten on a single card in simple code they may be continued on a second punch card. Data in columns 8 and 9 in the first card may be correlated with data punched in columns 25 and 26 of the second card. Certain elements of this operation have been described in a technical publication (*13*) which, however, fails to indicate how greatly this procedure increases the value of the punch card method and permits the use of simple codes instead of complicated codes. The last three methods have been extended, improved, and tested in actual use by Dr. E. C. Hammond, of the Division of Industrial Hygiene, who plans to publish a description of them shortly.

The methods described in this paper were developed during the course of analysis of medical data obtained during field studies carried out by the Division of Industrial Hygiene of the National Institute of Health. These include epidemiological studies of workers exposed to dust (*3, 4, 6*), mercury (*11, 12*), lead (*5*), lead arsenate (*10*), and fatigue (*7*). In each of these field studies the clinical and laboratory findings of 500 to 2,500 workers were correlated with each other and with measurements of the intensity and duration of exposure to the condition under study.

EXAMPLE OF CODING AND TABULATING METHODS

The simplest way to describe the coding and tabulating methods under discussion here is to present a series of exhibits through which the records of a single individual can be traced. The data of figures 1 and 2 and of table 1 have been drawn from a recent study of mercurialism in the felt-hat industry (*11*). Figure 1 consists of excerpts from a record form filled out by an examining physician in a field office. The estimate of average atmospheric mercury exposure, in this instance 2 7 milligrams of mercury per 10 cubic meters of air, and a code number designating the man's occupation (05 in the example) were filled in by the engineer who studied working conditions. These numbers were written in above the occupational history. Before planning the punch-card procedure several simple systems of tabulations were carried out by hand on a sample of the records to select the clinical and laboratory findings that could be usefully tabulated in more than one type of table. Copies of a combined code sheet and transcription sheet for the card punch operator bearing these items were prepared and the records of each man were transferred to a

separate sheet, shown in figure 2. Entries on the history form may be traced on the transcription sheet.

It is desirable from every point of view, in the statistical treatment of research data, for the person who is to interpret the data to do the

U. S. PUBLIC HEALTH SERVICE

Plant X Hat Company Date 1938 Case number 000

Name John Doe

Birthplace Ireland Parents Ireland Racial stock Irish

Age 63 Began work 18 Years worked 45

2.7 mg Hg/10 m³ of air

OCCUPATIONAL HISTORY

Specific job 05	Industry	Years Hg	Years Other	Remarks
Foreman, forming room	Hatting	16		X Hat Company
Sizer	Hatting	1		A Hat Co.
Foreman, forming room	Hatting	23		B Hat Co.
Various jobs, forming	Hatting	5		Various hat companies
		45		

VASO-MOTOR DISTURBANCES

Dermographia Absent Present 1 2 3
Abnormal blushing Absent Present 1 2 3
Excessive perspiration Absent Present 1 2 3

NEUROLOGICAL EXAMINATION

Motor
- atrophy, degree 1 2 3 No
- fibrillation, degree 1 2 3 No
- paralysis { spastic, flaccid; extensor, flexor } 1 2 3 No
- tremor { coarse fine 1 2 3; intention not intention; eyelids, tongue, face, hands }

Tremor of the hands goes from fine to coarse.

Biceps jerk decreased 1 2 3 increased 1 2 3
Elbow jerk decreased 1 2 3 increased 1 2 3
Wrist jerk decreased 1 2 3 increased 1 2 3
Knee jerk decreased 1 2 3 increased 1 2 3

Sensitive tendo-Achilles No

Gait abnormality None, except difficult for him to step on scales.

Positive Romberg No

Speech abnormality Has slurring speech, some hesitancy

Hand steadiness test Not able to complete test due to tremor

While performing test, tremor began in face muscles

DIAGNOSIS OF MERCURIALISM: Essentially negative; borderline case
Stage 1; stage 2, stage 3 mercurialism

DIAGNOSIS OF OTHER DISEASE ....

PAN. JWH ASG M. D.

FIGURE 1.—Portions of the history of a case of mercurialism. Pertinent information has been transferred, in numerical code, to the transcription sheet shown in figure 2. This case also appears in the lower part of figure 3.

coding also. Experience has shown that transcription sheets of the kind shown in figure 2 so facilitate the coding process that one of the physicians who made the field medical examinations can code all of the medical data in a relatively short time. This procedure has been

followed in all of the recent field studies of this Division. A clerk can copy other data. In this form it is easy to verify the correctness of coding at any time.

It is best to arrange the transcription sheet so that the code numbers are lined up. In this way the card punch operator does not need to look from side to side for the numbers he punches in the card.

TRANSCRIPTION SHEET HATTING STUDY

Col.

CENSUS DATA

1 - 3 999 Case number
4 (0) male; 1= female (encircle one)
5 - 6 63.. Age, directly
7 - 8 05.. Occupation See supplementary occupational code
9-10 45.. Years employed

Do not mark X in this field

Mg. mercury per 10 cubic meters of air
11-12 2.7. at time of study
13-14 2.7. weighted average

DIAGNOSIS OF MERCURIALISM

15 0 non-affected (encircle one)
5 borderline case
1, 2, (3) stage mercurialism

PAST MEDICAL HISTORY

Code 0 if condition is absent, 1 if present, and X if unknown

16 0 1 Nervous disease
17 0 1 Shakes
18 0 1 Digestive disorder
19 0 1 Stomatitis

SPECIAL SYMPTOMS

20 0 1 Unsociability
21 0 1 Weakness
22 0 1 Drowsiness
23 0 1 Insomnia
24 0 1 Headache
25 0 1 Vertigo
26 0 1 Tremor
27 0 1 Paraesthesia
28 0 1 Metallic taste

GENERAL DESCRIPTION

0 = absent
1 = slight
2 = moderate
3 = severe

29 0 1 2 3 Pallor
30 0 1 2 3 Sclera injected
31 0 1 2 3 Gingivitis
32 0 1 2 3 Pharynx inflamed
33 0 1 2 good fair poor Oral hygiene

HEART

34-36 ...... Systolic blood pressure
37-39 ...... Diastolic blood pressure
40 0 1 2 3 Arteriosclerosis
41-42 ...... Heart disease
(The code for diseases of the heart is incorporated in the field manual.)

Col.

TREMOR

43 0 =absent Fine 1 (2) 3
Coarse 4 5 6
(+ ++ +++)

44 0= absent; (1)= intention tremor
2= not intention tremor

45 Distribution of the tremor
0= absent; 1= hands only
2= hands and 1 other member
3= hands and 2 other members
(4)= hands and 3 other members
5= generalized tremor

TENDON REFLEXES

		Normal	Decreased +	++	+++	Increased +	++	+++
46	Biceps	0	1	2	3	4	(5)	6
47	Elbow	0	1	2	3	4	(5)	6
48	Wrist	0	1	2	3	4	(5)	6
49	Knee	0	1	2	3	4	(5)	6

50 0 (1) Speech disturbances
51 0 1 2 (3) Score on hand steadiness test

VASO-MOTOR DISTURBANCES

		Absent	+	++	+++
52	Excessive perspiration	0	(1)	2	3
53	Abnormal blushing	0	1	2	(3)
54	Dermographia	0	(1)	2	3

LABORATORY FINDINGS

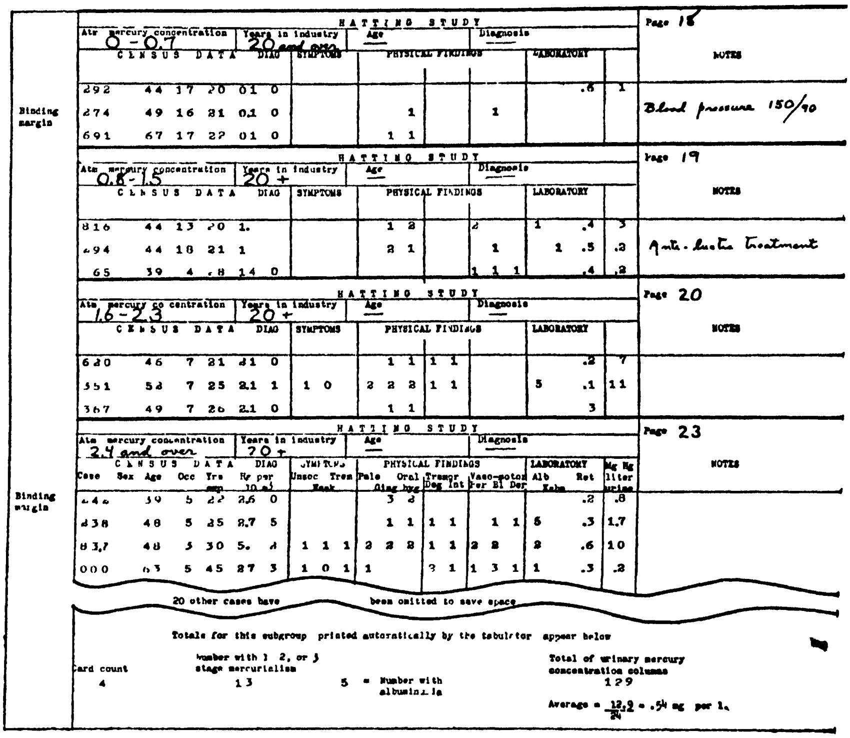
	Urine	Absent	Trace	+	++	+++	++++	Unk
55	Albumin	0	5	1	2	3	4	X
56	Sugar	0	5	1	2	3	4	X
57	Casts	0	5	1	2	3	4	X
58	R B C	0	5	1	2	3	4	X
59	W B C	0	5	1	2	3	4	X
60	Kahn	0		1	2	3	4	X

61-62 ..... Hemoglobin (See supplementary code)
63-64 ..... Erythrocyte count; code 4,820,000 as 48
65-66 ..... Reticulocyte percent; code 0.6 as 06; 7.2 as 72, and any values over 9.9 as 99
67-68 ..... Lymphocytes, percent, as is
69-70 ..... Deviation of weight from expectation
71-72 ..... Deviation of systolic b.p. from "
73-74 ..... Deviation of diastolic b.p. from "
75-77 ..... mg. mercury per liter of urine
78-80 Blank--to be punched as needed for machine control

FIGURE 2—The coded data pertaining to a single case are assembled on a transcription sheet before being transferred to a punch card.

Table 1 is one of a long series of tables in which diagnosis and the separate clinical and laboratory findings were tabulated in relation to duration and intensity of atmospheric mercury exposure. It represents a classification of the population of hatters into 12 sub-

groups, as nearly equal in number as the nature of the data permitted, on the basis of the average atmospheric mercury concentration pre-


Binding margin

HATTING STUDY — Page 18
Atm mercury concentration 0-0.7 | Years in industry 20 and over | Age | Diagnosis
CENSUS DATA | DIAG | SYMPTOMS | PHYSICAL FINDINGS | LABORATORY | NOTES
292 44 17 20 01 0 .6 1
274 49 16 21 0.1 0 1 1 — Blood pressure 150/90
691 67 17 22 01 0 1 1

HATTING STUDY — Page 19
Atm mercury concentration 0.8-1.5 | Years in industry 20 + | Age | Diagnosis
CENSUS DATA | DIAG | SYMPTOMS | PHYSICAL FINDINGS | LABORATORY | NOTES
816 44 13 20 1. 1 2 2 1 .4 3
294 44 18 21 1 2 1 1 1 .5 .2 — Anti-luetic treatment
65 39 4 28 14 0 1 1 1 .4 .2

HATTING STUDY — Page 20
Atm mercury concentration 1.6-2.3 | Years in industry 20 + | Age | Diagnosis
CENSUS DATA | DIAG | SYMPTOMS | PHYSICAL FINDINGS | LABORATORY | NOTES
620 46 7 21 21 0 1 1 1 1 .2 7
551 52 7 25 2.1 1 1 0 2 2 2 1 1 5 .1 11
367 49 7 26 2.1 0 1 1 3

HATTING STUDY — Page 23
Atm mercury concentration 2.4 and over | Years in industry 20 + | Age | Diagnosis
CENSUS DATA: Case Sex Age Occ Yrs emp | DIAG Hg per 10 m3 | SYMPTOMS Unsoc Trem Weak | PHYSICAL FINDINGS Pale Oral Ging hyg, Tremor Deg Int, Vaso-motor Per Bl Der | LABORATORY Alb Keha Ret | Mg Hg liter urine | NOTES
Binding margin
646 39 5 22 2.6 0 3 2 .2 .8
238 48 5 25 2.7 5 1 1 1 1 1 1 5 .3 1.7
837 48 5 30 5. 2 1 1 1 2 2 2 1 1 2 2 2 .6 10
000 63 5 45 27 3 1 0 1 1 3 1 1 3 1 1 .3 .2

20 other cases have been omitted to save space

Totals for this subgroup printed automatically by the tabulator appear below

Card count 4 | Number with 1, 2, or 3 stage mercurialism 13 | 5 = Number with albuminuria | Total of urinary mercury concentration columns 129
Average = 12.9/24 = .54 mg per l.

FIGURE 3 —One listed sheet (listing continued on following pages if necessary) was prepared on a printing tabulator for each of the 12 subdivisions of table 1 Portions of four sheets are shown Each sheet was labelled to show the subdivision of the data it represented All entries represent fictitious cases.

vailing in their place of work and on the basis of the number of years they had been so exposed.

TABLE 1 —*Number and percent of first-, second-, and third-stage mercurialism cases among hatters, classified by duration and intensity of mercury exposure*

Milligrams of mercury per 10 cubic meters of air	Within each exposure group	Years of mercury exposure		
		0-9	10-19	20 and over
0-0 7	Number affected	0	0	0
	Number exposed	36	10	20
	Percent affected	0	0	0
0 8-1.5	Number affected	1	2	2
	Number exposed	76	31	20
	Percent affected	1.3	6.5	10.0
1.6-2 3	Number affected	3	14	18
	Number exposed	80	80	77
	Percent affected	3.8	17.5	23.4
2.4 and over	Number affected	2	4	13
	Number exposed	30	27	24
	Percent affected	6.7	14.8	54.2

SELECTIVE LISTING

To provide the materials for this series of tables, the punch cards were sorted into the requisite 12 subgroups and each subgroup was run through a printing tabulator wired to list the coded data as in figure 3. Figure 3 shows portions of 4 of the 12 sheets, or sets of sheets, required to assemble the data of table 1 and similar tables.

The printing tabulator can be wired so that data for several different kinds of tables can be assembled simultaneously. Several of its functions are illustrated by totals and by summary figures printed at the foot of the last tabulator sheet presented in figure 3.

The usefulness of listings of this kind is greatly increased if the cards are first put in order with respect to one of the variables being listed. Thus, in the data under discussion, the cards were first sorted so that the records of men employed 20 years came at the head of the list, followed by the records of men employed 21 years, and so on. Men with the longest periods of employment were listed at the end of the subgroup. This permits two additional operations. If one suspects that a finer classification by duration of exposure would display the data to better advantage, for instance, segregating the men employed 20 to 29 years, inclusive, from the men employed 30 years or more, it is a simple matter to pick out and summarize the records that belong in the new subgroups. Second, if one wants to set up a frequency distribution for a variable, listed data permit one to experiment with fine or with coarse class intervals. When a sorting machine is used to obtain frequency distributions, division of the range of variation into class intervals is often a highly arbitrary matter. Unsatisfactory class intervals, particularly too coarse a grouping, may throw means and standard deviations into error

It is convenient to list coded data on mimeographed sheets with properly spaced columnar headings. Sheets of listed data can be handled and filed conveniently if all the sheets for a particular pattern of table are stapled together along a binding margin at the left to form a book.

In the hatting study, four such books corresponding to as many patterns of table were made up. One is shown, in part, in figure 3. A second was set up on the same pattern except that the records were classified in terms of the atmospheric mercury concentration that prevailed at the time of the study instead of by a weighted average mercury concentration. A third book classified hatters by age and by diagnosis of mercurialism, and a fourth classified them by occupation and by duration of employment.

ADVANTAGES GAINED BY LISTING CODED DATA ON TABULATOR SHEETS

1. The most obvious advantage gained by building up tables from listed data is that the accuracy of coding and classification

may be verified at any time. To illustrate, if the data of table 1 had been assembled by means of a sorting machine, the information about the incidence of mercurialism among hatters exposed for more than 20 years to mercury concentrations in excess of 2.4 milligrams Hg per 10 cubic meters of air, for example, would be limited to the two items that could be read from the dials of the sorting machine, namely, that there were 13 mercurialism cases among the 24 men thus exposed. The listing procedure, on the other hand, would show *which* 24 men were thus classified. One could read the printed entries and find out whether or not they had been properly classified. By reading each sheet, in turn, one can locate the records of persons accidentally thrown into other subgroups. Further, the case number listing makes it easy, if desirable, to look up the original records of any or all of the individual subjects and verify the coding and make a more detailed study of certain subjects.

2. Each line of listed data may be read as an abbreviated case history. In certain respects, comparisons between cases can be made more readily when they are assembled in this form than in the original written record because the irrelevant findings have been winnowed out, and the records of individual subjects are systematically arranged on a single sheet. The system of coding represented in figures 1 and 2 is easy to memorize. Basically, it rests on three principles: (*a*) If a condition can be either present or absent, its presence is designated by "1," its absence by zero. (If desired, one can wire the printing tabulator so that zeros will not print at all.) (*b*) If a condition like pallor or albuminuria is present to a slight, moderate, or severe degree, these gradations may be coded as 1, 2, and 3. During field medical examinations, physicians have found it convenient to record their findings in this system of notation by encircling a 1, 2, or 3, as the case may be, on the medical record form opposite the name of each condition they investigate, in effect, coding their findings as they record them. Britten (*1*) has pointed out the importance of systematizing the original entries. (*c*) Insofar as possible, the most familiar quantitative findings, such as blood pressures and erythrocyte count, have been recorded in the units in which they were measured. This is not strictly necessary, however, and further discussion of this point appears later in this paper.

There may be instances in which one might prefer to have the occurrence of insomnia indicated by the abbreviation INS instead of the symbol "1" in a certain column. The alphabetic printing tabulator can be wired so that it will print 2- or 3-letter alphabetic abbreviations for data coded in the way that the past medical history and special symptoms are coded in figure 2. Hammond and Edwards (*9*) have prepared an account of this method for publication.

3. It is desirable to have all of the clinical and laboratory data that appertain to an individual available at the time the cards are punched. In practice, this is not always possible. Three alternative methods of meeting this situation may be noted. (*a*) One may leave enough blank columns at the right end of the card to accommodate the additional data, and punch them in when they become available. It is desirable to leave a few blank columns at the right for other reasons. (*b*) One may prepare a second punch card for each individual. This was necessary in the hatting study. Each punch card carried the data to be used as independent variables (referred to as census data) at the left of the card. Thus, every dependent variable on either card could be classified into a table like table 1 or into any other form in which cards were sorted on the basis of data entered in columns 1 to 15, inclusive. Items punched in one card can, of course, be correlated with items punched on a second card. (*c*) If neither of these courses is practicable, one may draw up skeleton tables for the data to be available later, and, with a printing tabulator, list the cases that would be thrown into each subgroup of the skeleton table. Preferably, the cases should be listed in serial order by case number. Opposite the case number, one may copy the new data that appertain to that case. This system was necessary in a study of the effects of lead arsenate on man (*10*) because additional sets of chemical analyses of blood and urine samples became available at different times. Of the 55 tables in that publication in which clinical or laboratory findings were presented, 20 were built up from one book of tabulator sheets.

4. The punch-card method is most directly adaptable to data that can be expressed in numerical form or to observations that can be classified without difficulty into distinct categories, each of which can be designated by a code number. Not all medical and scientific observations can be thus classified, without loss of significance. It is often desirable to retain qualifying words that appear on the written record or to retain explanations that would modify the interpretation placed on a punch-card entry. Tabulator sheets, on the plan of the ones in figure 3, make this possible. The printed punch-card entries can be supplemented by verbal entries of any kind that may be pertinent. When text is being written for publication, enough information will be at hand to permit an accurate appraisal of the meaning of the formal table.

5. On occasion, two or more persons, collaborators or consultants, may wish to work with the same data simultaneously, in widely separated places. If people who are to work independently draw up skeleton tables corresponding to the lines of study they intend to carry out, a central statistical laboratory or one of the service bureaus maintained by the firms that install punch-card equipment can pre-

433648°—42——3

pare tabulator sheets which will provide all the data each person needs.

6. There is a limit, of course, to the amount of verbal entries that can and should be written on sheets of listed data. In certain types of investigation it is desirable for the person who writes text for publication to return to the original written record frequently, instead of relying implicitly on the inferences he can draw from formal tables. Tabulator sheets, such as those of figure 3, can be used as an index to the file of original records. For instance, one may wish to look up the record of a case of mercurialism that occurred in an unusually low exposure group. Or, in describing the symptomatology of mercurialism, one may need to consult all the histories of the second- and third-stage cases of mercurialism. Or, one may wish to find out whether or not there is some connection between the excretion of mercury in the urine and the presence of albumin in the urine. In each instance, by working from the listed data one may quickly assemble the records needed to answer the question under study.

7. Data listed in this form can be used to set up efficient systems of sampling. For example, if one wished to study the mercury content of blood samples in relation to the variables defined in table 1, and if the methods of analysis were known to be difficult and time-consuming, it might be desirable to find a means by which enough analyses could be obtained to establish reliable trends without overloading the analyst. Reference to the number of hatters classified in each of the subgroups of table 1 will show that 1 of the 12 subgroups contains as few as 10 men and 4 others contain about 80 men. To form such a table of average values for the mercury content of blood, one ought to have analyses on the blood of all of the 10 men, but one could draw a sample from the largest groups. Choice of an appropriate sampling procedure is necessarily governed by the nature of the data.

SUGGESTIONS FOR CODING DATA

The following suggestions for coding have been found to expedite the use of a printing tabulator for listing, for controlling the various functions of the tabulator, and for obtaining the values needed for means, standard deviations, and correlation coefficients by methods described elsewhere.

1 Always punch the case number in the card (*a*) to assist in verifying the accuracy of the punched data, (*b*) to be able to trace an anomalous or noteworthy record back to its source, and (*c*) to make it possible to put data for the same individual on two or more punch cards without interfering with intercorrelation of data punched on separate cards.

2. Always set aside fields of the card in which an X (the eleventh position in the column) will never be punched If possible, leave a

few columns blank at the right end of the card. This makes it possible to punch in an X at a later time which will be a signal to the tabulating machine to control one of its various functions.

3. Insofar as possible, in other fields use the 11th (X) and 12th (V) positions sparingly. On many tabulators these positions do not have a separate symbol and they may be printed as a zero.

4. Always provide a place in the code for "no information available."

5. It is desirable to avoid double-punching. It is preferable to use a separate column for each item, even for findings that are recorded only as present or absent. Double-punching and combination codes are often used, but all too frequently the apparent advantage gained by saving space on the card is lost in the resulting waste of time in the tabulating room and in the increased likelihood of error. If duplicate cards are prepared, one of the two punches in a column may be lost. If two numerical code numbers are put in the same column, listing is made more complicated. It is more satisfactory to use two cards to carry the record of an individual in simple coding than to attempt to compress the records on one card by use of a complicated code.

6. Data entered on the original record forms in numbers (e. g., age, weight, concentration values, blood pressures) may be used for more than one purpose when they are transferred to punch cards, and a coding procedure that may facilitate one operation may interfere with another. For instance, if records of age are to be printed on a tabulator sheet to be available in studying the rest of the case record, it is desirable to have the record of a 67-year-old man printed with 67 in the age column On the other hand, if tables showing the incidence of cancer or tuberculosis by 5-year age groups are to be built up it would be more convenient to designate his age group (65–69) by a single code number.

Consideration should be given to the possibility of entering numerical data in two ways—in the units of measurement and coded for convenient use of machine methods.

In the following discussion, the principles that apply to the coding of numerical data have been classified by the use to which they are put. They are illustrated, in part, by reference to the problems that arise in coding blood pressure values.

When *means* and *standard deviations* are to be calculated the first step in preparing a code is to know the range over which the values are distributed. This range should be subdivided into 20 to 30 *equal* class intervals, and 2 columns should be utilized. If the data are classified into as few as 10 or 12 class intervals, for instance, systematic errors enter into the calculation of average values and standard deviations. In the interests of accuracy, one should avoid, as far as

possible, defining the lowest class interval as "under 80" and the highest class interval as "over 280," for example.

When punched data are to be used to *control* the tabulation of data entered in other columns (the principle involved in many labor-saving machine methods described elsewhere), it is desirable to code in such a way that only one column will be needed for control. To illustrate, if the data of table 1 were to be assembled on a printing tabulator more efficiently than they can be assembled with a sorting machine, the tabulator might be wired so that whenever "08" or "06", for example, appeared in the columns for "years of mercury exposure," the *zero* in the tens place would be the signal to the tabulating machine to add certain items on that card into counters set aside for the records of persons employed less than 10 years. Further, if "12" or "18" appeared in the column for years of mercury exposure, the *one* in the tens place would be the signal for the tabulator to add certain items on that card into counters set aside for the records of persons employed 10 to 19 years. Finally, if "28", "34", or "42" appeared in the columns used for control, the *two, three,* or *four* in the tens place would be the signal for the tabulator to add certain items into a third set of counters reserved for men employed more than 20 years. One digit selector is used to discriminate the cards punched *zero* from the cards punched *one* and from the cards punched *two, three,* or *four.*

To continue with the same illustration, the code of atmospheric mercury exposure should be so arranged that the second of the two digit selectors could be used to classify the data with respect to intensity of exposure at the same time that the first digit selector is classifying them by duration of exposure. The atmospheric concentration code defined in figure 2 is not a satisfactory means of obtaining the intervals 0–0.7, 0.8–1.5, 1.6–2.3, and so on, because two digit selectors would be needed for that one function. If machine methods were to be applied on a large scale to data coded in this way, a supplementary code for intensity of exposure should be punched into one of the columns at the right end of the card, column 80, for instance, left blank for such a purpose. This supplementary code could be so defined that persons exposed to less than 0.7 milligrams Hg per 10 cubic meters of air would be coded zero in column 80; persons exposed to 0.8 to 1.5 milligrams Hg per 10 cubic meters of air would be coded one in column 80, and so on.

A discussion of problems that arise in coding blood pressure values exemplifies some of the principles just referred to and serves to introduce others. Three characteristics of these data should be mentioned. The systolic blood pressures of employed men and women examined by Public Health Service physicians in the course of field studies of industrial health hazards range from 80 to 280 millimeters Hg. Most

of the values fall within the range 100 to 150 millimeters Hg. Usually the manometer scale is read to the nearest *zero* or the nearest *five*. The obvious procedure would be to code the systolic pressure directly; when printed on a tabulator sheet, physicians would find blood pressure expressed in the units in which they measure and discuss this finding. However, the blood pressure is not known to three-place accuracy, and there may not be enough space on the card to set aside three columns for this one finding. An alternative is no more satisfactory, namely, dropping the last place and coding a pressure of 80 as "08" and a pressure of 280 as "28". There are two objections to this procedure: First, most of the systolic blood pressure values would be coded 10, 11, 12, 13, or 14, and trustworthy means and standard deviations could not be calculated. Second, if the standard methods for calculating means from grouped data are applied (assuming, for example, that the midpoint of the interval 120–130 lies at 125), the means are higher than if calculations had been made from ungrouped data. As Britten and Thompson (*2*) pointed out, it is necessary to assume that the midpoint falls at 3 instead of 5. This, of course, is a consequence of reading the scale to the nearest *zero* or the nearest *five*, a complication that may enter into any set of measurements. A third procedure, also found to be unsatisfactory in practice, would be to convert the three-figure readings into a two-column code by dropping the number in the hundreds place. This would result in coding 128 as "28" and it would also result in coding 228 as "28". It is generally more satisfactory, from the standpoint of accuracy, to set up a code in which the interval 78–82 will be designated as 01, 83–87 as 02, 88–92 as 03, and so on. If no record is available, this may be indicated by punching XX.

SUMMARY

This paper describes methods of tabulating data which have been developed during the course of analysis of sets of data in which the influence of relatively large numbers of variables had to be traced in comparatively small numbers of cases. These methods have been used when data were assembled by hand, without special equipment. When punch-card equipment (card punch, sorting machine, and printing tabulator) is available, its use will often save time and permit an investigator to put more hypotheses to test with his data than would be possible if he used slower methods.

In instances where it is hard to decide whether or not time will be saved by transferring data to punch cards it is suggested that the number of variables to be intercorrelated is more important than the number of case records under study.

Suggestions for coding are presented which have been found to facilitate the subsequent use of a printing tabulator for (1) listing classified data so that they can be read as individual case histories, (2) obtaining sums of quantitative data and counts of nonquantitative data, (3) controlling the operation of the tabulator so that the coding of one part of the punch card will determine the operation the machine will carry out on data punched in another part of the card, and (4) for using the tabulator to compute sums of products and sums of squares.

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DEATHS DURING WEEK ENDED DECEMBER 20, 1941

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec. 20, 1941	Corresponding week, 1940
Data from 88 large cities of the United States:		
Total deaths	8,728	8,697
Average for 3 prior years	8,589	
Total deaths, first 51 weeks of year	426,488	427,313
Deaths per 1,000 population, first 51 weeks of year, annual rate	11.7	11.7
Deaths under 1 year of age	525	518
Average for 3 prior years	485	
Deaths under 1 year of age, first 51 weeks of year	27,065	25,746
Data from industrial insurance companies:		
Policies in force	64,742,923	64,781,253
Number of death claims	12,503	11,617
Death claims per 1,000 policies in force, annual rate	10.1	9.4
Death claims per 1,000 policies, first 51 weeks of year, annual rate	9.3	9.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED DECEMBER 27, 1941

Summary

General health conditions, as indicated by the reports of the nine important communicable diseases presented in the following table, remain favorable.

There was a further slight decrease in the number of cases of influenza; 2,604 cases were reported as compared with 2,693 during the preceding week. During the corresponding week last year 45,475 cases were reported. Texas (1,254 cases), Virginia (260), South Carolina (203), Arizona (157), and Oklahoma (120) reported the largest numbers of cases.

The incidence of poliomyelitis continued to decline. Thirty-nine cases were reported during the current week, as compared with 55 during the preceding week. New York, with 6 cases, and Pennsylvania and Minnesota, with 4 cases each, were the only States reporting more than 2 cases.

Of 49 cases of typhus fever, 30 were reported in Georgia. Seven cases of tularemia were reported in Illinois, 2 in Michigan, and 1 case each in Maryland, North Carolina, and Mississippi.

The crude death rate in 88 large cities for the current week was 11.5 as compared with 12.2 for the preceding week. The cumulative rate to date this year is 11.6 as compared with 11.7 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended December 27, 1941, and comparison with corresponding week of 1940 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that although none were reported, cases may have occurred

Division and State	Diphtheria			Influenza			Measles			Meningitis meningococcus		
	Week ended—		Median 1936-40	Week ended—		Median 1936-40	Week ended—		Median 1936-40	Week ended—		Median 1936-40
	Dec 27, 1941	Dec 28, 1940		Dec 27, 1941	Dec 28, 1940		Dec 27, 1941	Dec 28, 1940		Dec 27, 1941	Dec 28, 1940	
NEW ENG												
Maine	0	0	3		24	6	192	35	35	0	0	0
New Hampshire	0	0	0			-	6	0	2	2	0	0
Vermont	0	0	0			-	4	44	24	0	0	0
Massachusetts	1	1	3				118	223	191	3	1	1
Rhode Island	2	0	0		- -		26	1	1	0	0	0
Connecticut	0	1	1	1	1	4	76	9	50	2	1	1
MID ATL												
New York	11	20	26	[1] 10	[1] 32	[1] 17	344	1 098	319	5	2	5
New Jersey	12	9	15	17	6	16	38	405	119	3	0	0
Pennsylvania	15	13	25				533	966	60	1	1	2
E NO CEN												
Ohio	7	10	25	14	55	35	47	224	25	0	2	4
Indiana	10	12	18	37	[illegible]	35	25	32	8	0	0	0
Illinois	24	3	36	6	24	24	36	734	22	0	0	2
Michigan [2]	4	5	17		6	3	38	795	172	2	0	1
Wisconsin	0	1	3	31	44	44	172	309	223	2	1	0
W NO CEN												
Minnesota	2	0	1				107	3	8	0	0	0
Iowa	2	0	5	1	201	10	75	114	56	0	1	0
Missouri	10	1	14	5	16	29	27	11	3	0	1	1
North Dakota	1	2	2	17	43	12	133	16	3	0	1	0
South Dakota	8	2	2			1	0	1	1	0	0	0
Nebraska	0	0	0				4	10	3	0	0	0
Kansas	3	6	8	10	1 [illegible]	4	117	88	53	1	0	0
SO ATL												
Delaware	0	0	0				0	4	2	0	0	0
Maryland [2]	9	2	[illegible]	5	7	14	133	9	11	1	2	2
Dist of Col	0	1	2		6	5	0	5	5	1	0	0
Virginia	32	32	32	[illegible]	[illegible]	175	103	180	38	3	1	1
West Virginia	6	6	12	17	15	19	92	16	20	0	2	2
North Carolina [3]	14	13	35	1	6	14	212	136	136	0	1	1
South Carolina	12	5	[illegible]	203	410	347	45	53	15	1	0	0
Georgia	14	10	10	13	[illegible]	124	[illegible]	25	[illegible]	0	0	0
Florida	9	3	8	16	38	3	2	0		0	0	2
E SO CEN												
Kentucky	4	5	13	1	1 089	22	32	135	17	0	3	4
Tennessee [3]	11	4	10	61	[illegible]	45	73	5	5	0	0	1
Alabama [3]	12	13	11	[illegible]	332	332	5	32	3	3	3	3
Mississippi	8	5	11							0	0	1
W SO CEN												
Arkansas	11	7	[illegible]	98	4 [illegible]	192	26	304	44	0	0	0
Louisiana [3]	8	1	13		6 101	10	3	2	2	2	1	1
Oklahoma	16	14	14	190	1 848	[illegible]	113	4	4	0	0	2
Texas [3]	51	40	40	1 254	7 307	444	[illegible]	[illegible]	[illegible]	2	3	2
MOUNTAIN												
Montana	0	2	1	6	388	[illegible]	41	3	3	0	0	0
Idaho	1	0	0		18	[illegible]	4	2	[illegible]	0	0	0
Wyoming	0	0	0	10	[illegible]		3	1	1	1	0	0
Colorado	5	1	6	69	80	41	9	70	22	0	0	0
New Mexico	0	1	1		[illegible]	6	6	28	22	0	0	0
Arizona	3	2	2	157	1 735	102	[illegible]	80	4	0	0	0
Utah [2]	0	0	1	27	5 048	8	48	2	16	0	0	0
Nevada	0				968		0			0		
PACIFIC												
Washington	1	6	8	1	1 686		17	17	17	0	0	0
Oregon	3	3	1	17	1 8[illegible]	40	84	13	15	0	0	0
California [3]	14	10	39	60	7 128	38	546	38	48	2	2	2
Total	351	302	568	2 604	45 475	2 107	4 189	6 378	4 781	37	29	43
52 weeks	16 922	15 715	27 892	597 990	309 669	189 352	868 643	276 032	302 242	2 023	1,667	2,824

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended December 27, 1941, and comparison with corresponding week of 1940 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1936–40	Week ended—		Median 1936–40	Week ended—		Median, 1936–40	Week ended—		Median, 1936–40
	Dec 27, 1941	Dec 28, 1940		Dec 27, 1941	Dec 28, 1940		Dec 27, 1941	Dec 28, 1940		Dec 27, 1941	Dec 28, 1940	
NEW ENG												
Maine	1	1	0	11	4	19	0	0	0	1	0	0
New Hampshire	0	0	0	9	2	4	0	0	0	1	0	0
Vermont	0	0	0	1	8	8	0	0	0	0	1	0
Massachusetts	0	0	0	196	144	144	0	0	0	3	0	1
Rhode Island	0	0	0	9	4	5	0	0	0	0	0	0
Connecticut	1	0	0	17	24	49	0	0	0	1	0	0
MID ATL												
New York	6	2	1	299	252	371	0	0	0	13	8	6
New Jersey	2	1	0	95	147	114	0	0	0	1	1	3
Pennsylvania	4	0	0	180	180	217	0	0	0	6	7	7
E NO CEN												
Ohio	2	3	0	225	190	328	0	0	2	7	1	4
Indiana	0	3	0	122	125	128	1	2	5	0	2	1
Illinois	2	3	3	182	326	326	1	11	5	5	1	1
Michigan [2]	0	2	1	160	194	301	0	4	0	0	2	6
Wisconsin	0	5	0	112	124	170	0	13	7	0	0	0
W NO CEN												
Minnesota	4	1	1	58	45	104	5	25	25	0	0	1
Iowa	0	2	0	45	70	102	0	1	12	1	1	1
Missouri	0	0	0	78	34	91	0	0	9	0	1	3
North Dakota	0	0	0	5	13	18	1	0	0	0	0	0
South Dakota	1	0	0	37	12	23	0	0	4	0	0	0
Nebraska	0	0	0	24	6	21	0	0	1	0	0	0
Kansas	1	1	0	62	65	148	1	0	0	0	0	[illegible]
SO ATL												
Delaware	0	0	0	26	3	8	0	0	0	0	0	0
Maryland [2]	0	0	0	53	35	35	0	0	0	3	4	4
Dist of Col	0	0	0	13	10	12	0	0	0	1	0	1
Virginia	2	1	0	49	62	39	0	0	0	8	4	5
West Virginia	0	1	0	[illegible]	51	71	0	0	0	2	1	1
North Carolina [3]	0	0	0	26	50	44	0	0	0	0	3	3
South Carolina [3]	1	0	0	7	10	8	0	0	0	0	0	0
Georgia [3]	0	0	0	13	29	20	0	0	0	2	2	5
Florida	0	0	1	10	5	10	0	0	0	1	2	2
E SO CEN												
Kentucky	2	0	1	48	53	58	0	0	0	2	4	2
Tennessee [3]	2	0	0	70	75	38	0	0	0	1	5	2
Alabama [3]	0	2	1	37	20	20	0	0	0	1	6	6
Mississippi	1	0	1	6	11	10	0	0	0	0	0	0
W SO CEN												
Arkansas	0	0	1	6	8	17	1	0	5	0	0	2
Louisiana [3]	0	0	0	8	1	12	0	0	0	9	5	4
Oklahoma	0	1	1	25	15	36	1	1	3	1	1	2
Texas [3]	2	2	2	57	69	75	4	1	3	4	6	9
MOUNTAIN												
Montana	0	0	0	23	9	16	0	1	5	2	0	0
Idaho	0	0	0	8	8	13	0	1	3	0	0	0
Wyoming	0	1	0	4	0	6	0	0	0	0	0	0
Colorado	1	0	0	16	26	26	0	1	1	0	1	1
New Mexico	0	0	0	5	5	15	0	0	0	1	0	4
Arizona	0	0	0	9	7	8	1	0	0	0	2	2
Utah [2]	2	1	0	13	1	8	0	0	0	0	0	0
Nevada	0			0			0			0		
PACIFIC												
Washington	1	0	0	26	24	48	1	0	4	0	1	0
Oregon	0	1	0	6	6	27	0	0	5	0	0	0
California	1	2	3	103	71	133	0	0	8	3	8	8
Total	39	36	27	2 651	2 629	3 552	17	61	152	80	80	106
52 weeks	9 056	9 769	7 288	127 505	155 064	186 532	1 368	2 402	9 574	8 513	9 585	14 230

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended December 27, 1941, and comparison with corresponding week of 1940—Con.

Division and State	Whooping cough, Week ended—Dec 27, 1941	Whooping cough, Week ended—Dec 28, 1940
NEW ENG.		
Maine	19	23
New Hampshire	11	0
Vermont	17	6
Massachusetts	125	233
Rhode Island	26	5
Connecticut	38	35
MID. ATL.		
New York	392	328
New Jersey	146	85
Pennsylvania	139	373
E. NO CEN.		
Ohio	161	253
Indiana	43	23
Illinois	177	120
Michigan [2]	163	292
Wisconsin	258	110
W NO CEN.		
Minnesota	30	38
Iowa	13	61
Missouri	19	7
North Dakota	2	18
South Dakota	1	2
Nebraska	2	13
Kansas	40	53
SO ATL.		
Delaware	0	7
Maryland [2]	21	65
Dist of Col.	11	17
Virginia	36	113
West Virginia	10	35
North Carolina [3]	100	79
SO ATL—continued		
South Carolina [3]	11	39
Georgia [3]	1	16
Florida	11	1
E. SO CEN		
Kentucky	39	45
Tennessee [3]	32	24
Alabama [3]	21	21
Mississippi	----------	----------
W. SO CEN.		
Arkansas	10	15
Louisiana [3]	1	3
Oklahoma	3	12
Texas [3]	74	160
MOUNTAIN		
Montana	8	3
Idaho	1	11
Wyoming	5	1
Colorado	14	19
New Mexico	23	12
Arizona	51	14
Utah [2]	17	16
Nevada	0	----------
PACIFIC		
Washington	55	27
Oregon	6	6
California [3]	147	128
Total	2, 530	2, 967
2 weeks	208, 460	170, 911

[1] New York City only.
[2] Period ended earlier than Saturday
[3] Typhus fever, week ended Dec 27, 1941, 49 cases, as follows North Carolina, [illegible], South Carolina, 4; Georgia, 30, Tennessee, 2, Alabama, 4, Louisiana, 2, Texas, 4, California, 2

WEEKLY REPORTS FROM CITIES

City reports for week ended Dec 13, 1941

This table lists the reports from 128 cities of more than 10 000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine											
Portland	0		0	2	2	10	0	1	0	4	21
New Hampshire											
Concord	0		0	0	0	1	0	0	0	0	5
Manchester	0		0	6	1	14	0	0	0	0	15
Nashua	0		0	3	0	4	0	0	0	9	4
Vermont											
Burlington	0		0	0	0	0	0	0	0	0	10
Rutland	0		0	0	1	0	0	0	0	0	4
Massachusetts											
Boston	2		1	14	10	59	0	8	1	50	183
Fall River	3		0	1	1	39	0	1	0	3	37
Worcester	0		0	3	4	23	0	3	0	17	47
Rhode Island											
Pawtucket	0		0	11	0	3	0	0	0	4	12
Providence	4		0	6	1	5	0	0	0	26	49
Connecticut											
Bridgeport	0	1	1	0	1	2	0	0	0	1	35
Hartford	0		0	2	4	0	0	1	0	1	50
New Haven	0		0	17	0	0	0	0	0	4	34
New York											
Buffalo	0		0	3	6	13	0	2	0	0	123
New York	12	8	1	14	58	126	0	65	2	307	1 354
Rochester	0		0	1	0	8	0	2	0	8	67
Syracuse	0		0	1	4	2	0	0	0	30	65
New Jersey											
Camden	0		0	0	0	2	0	0	1	14	34
Newark	0	10	0	4	3	16	0	5	0	36	91
Trenton	0	-	0	0	2	12	0	0	0	5	34
Pennsylvania											
Philadelphia	0	4	2	5	22	66	0	18	0	33	482
Pittsburgh	1	3	1	2	13	9	0	7	0	13	178
Reading	0		1	1	0	0	0	1	0	1	27
Scranton	0			7		2	0		0	0	
Ohio											
Cincinnati	0		0	0	0	18	0	13	0	13	121
Cleveland	2	16	0	0	17	48	0	9	0	31	205
Columbus	0	1	1	1	4	10	0	0	1	6	79
Toledo	0		0	1	3	1	0	2	0	13	82
Indiana											
Anderson	1		0	0	1	0	0	0	0	0	10
Fort Wayne	0		0	1	2	2	0	0	2	0	28
Indianapolis	1		0	4	10	20	0	1	0	1	102
Muncie	0		0	0	0	0	0	0	0	0	9
South Bend	0		0	0	0	3	0	0	0	0	11
Terre Haute	0		0	0	3	1	0	0	0	0	15
Illinois											
Chicago	34	5	0	10	22	78	0	28	2	133	662
Elgin	0		0	0	2	1	0	0	0	6	9
Moline	0		0	0	0	1	0	0	0	2	12
Springfield	0		0	0	0	4	0	0	0	0	17
Michigan											
Detroit	4		0	16	6	61	0	6	0	68	253
Flint	0		0	0	1	0	0	2	0	0	15
Grand Rapids	0		0	3	0	2	0	0	0	10	26
Wisconsin											
Kenosha	0		0	0	0	2	0	0	0	0	8
Madison	0		0	1	0	2	0	0	0	2	5
Milwaukee	0		0	6	0	26	0	2	0	122	103
Racine	0		0	3	0	2	0	0	0	24	7
Superior	0		0	0	1	0	0	1	0	0	7
Minnesota											
Duluth	0		0	2	0	2	0	0	0	1	27
Minneapolis	1		0	1	3	23	0	3	0	6	99
St Paul	0		0	26	2	4	0	2	0	11	73
Iowa											
Cedar Rapids	0			2	--	0	0	-	0	0	-------
Davenport	0			1	-	1	0		0	0	----
Des Moines	0		0	8	2	5	0	1	0	8	27
Sioux City	0			1	--	0	0	- ----	0	0	-------
Waterloo	0	------	--------	0	-------	1	0	-------	0	1	-------

City reports for week ended Dec 13, 1941—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Missouri											
Kansas City	0		0	0	7	11	0	4	0	0	110
St Joseph	1		0	0	1	3	0	0	0	0	13
St Louis	5		0	5	10	21	0	6	0	16	207
North Dakota											
Grand Forks	0			0		1	0		0	0	
Minot	0			52		0	0		0	1	12
South Dakota											
Aberdeen	0			0		0	0		0	0	
Sioux Falls	2			0		2	0		0	0	8
Nebraska											
Omaha	0		0	2	6	4	0	0	0	0	49
Kansas											
Lawrence	0			0		0	0		0	0	4
Topeka	0		0	0	0	3	0	0	0	3	7
Wichita	0	1	0	4	3	4	0	0	0	1	20
Delaware											
Wilmington	1		0	8	2	8	0	2	0	0	30
Maryland											
Baltimore	3	5	2	98	15	17	0	7	3	22	223
Cumberland	0		0	2	0	0	0	0	3	0	11
Frederick	0		0	0	0	0	0	0	0	0	5
District of Columbia											
Washington	0	1	1	2	9	9	0	8	2	10	174
Virginia											
Lynchburg	1		0	0	0	2	0	0	0	0	8
Norfolk	2		0	0	1	3	0	2	0	1	18
Richmond	3		0	0	3	2	0	3	0	0	51
Roanoke	0		0	0	0	1	0	0	0	0	22
West Virginia											
Charleston	0		0	0	0	1	0	1	0	2	20
Huntington	2			0		1	0		0	0	
Wheeling	0		0	24	0	5	0	0	0	1	16
North Carolina											
Gastonia	0			0		1	0		0	1	
Wilmington	0		0	47	0	0	0	0	0	1	12
Winston-Salem	3		0	51	0	1	0	4	0	0	20
South Carolina											
Charleston	0	34	0	1	1	1	0	0	1	0	24
Florence	0		0	0	1	0	0	0	0	0	13
Greenville	0		0	0	0	0	0	0	0	0	8
Georgia											
Atlanta	2		0	1	4	6	0	1	0	0	71
Brunswick	0		0	0	0	0	0	1	0	0	3
Savannah	1	1	0	16	2	1	0	0	0	0	32
Florida											
Miami	0	2	0	0	0	0	0	2		0	39
St Petersburg	0		0	0	1	0	0	0	0	5	20
Tampa	1	1	1	0	0	0	0	0	0	0	34
Kentucky											
Ashland	0		0	3	1	3	0	0	0	5	7
Covington	0		0	0	1	3	0	4	0	0	18
Lexington	0		0	0	0	1	0	2	0	2	12
Tennessee											
Knoxville	1		0	2	3	3	0	1	0	0	33
Memphis	1	4	2	0	5	1	0	0	1	8	57
Nashville	0		3	1	2	2	0	1	0	2	56
Alabama											
Birmingham	0	8	1	0	5	7	0	3	0	0	74
Mobile	2		1	[illegible]	2	0	0	1	0	0	30
Montgomery	0			0		0	0		0	0	
Arkansas											
Fort Smith	0			3		0	0		0	0	
Little Rock	0	15	0	0	1	2		0	0	1	19
Louisiana											
Lake Charles	0		0	0	1	0	0	0	0	0	10
New Orleans	1	2	0	1	9	5	0	8	0	0	143
Oklahoma											
Oklahoma City	1	2	0	0	0	4	0	1	0	0	39
Tulsa	6		0	195	1	3	0	0	0	0	13
Texas											
Dallas	7		0	38	2	3	0	3	0	1	69
Fort Worth	1		0	1	2	2	0	2	0	7	41
Galveston	0		0	0	1	0	0	1	0	0	20
Houston	2		0	1	9	5	0	5	0	0	95
San Antonio	2	19	1	1	8	2	0	7	0	1	72

City reports for week ended Dec. 13, 1941—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Montana											
Billings	0	-----	0	1	0	0	0	0	0	0	8
Great Falls	0	---	0	17	1	1	0	1	0	10	8
Helena	0	----	0	1	0	0	0	0	0	11	1
Missoula	0	-----	0	1	1	1	0	0	0	0	7
Idaho											
Boise	0	------	0	6	0	1	0	0	0	0	6
Colorado											
Denver	10	38	0	39	6	4	0	1	0	20	82
Pueblo	1	----	0	143	2	2	0	0	0	1	9
New Mexico											
Albuquerque	0	------	0	0	0	0	0	0	0	3	9
Arizona											
Phoenix	0	35	-------	7	-----	2	0	-------	0	9	--------
Utah											
Salt Lake City	0	-----	0	1	1	3	0	1	0	3	46
Washington											
Seattle	0	--	4	0	2	0	0	3	0	21	121
Spokane	0	4	1	0	1	7	0	1	0	6	28
Tacoma	0	- -	0	1	0	5	0	0	0	2	34
Oregon											
Portland	2	5	2	2	4	0	0	1	0	5	105
California											
Los Angeles	8	24	0	22	11	30	0	23	2	22	442
Sacramento	0		0	13	7	0	0	1	0	3	44
San Francisco	0	7	0	5	8	3	0	14	0	3	200

State and city	Meningitis, meningococcus		Poliomyelitis cases	State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
New Hampshire				**Indiana**			
Manchester	0	0	1	Muncie	0	0	1
Massachusetts				**Illinois**			
Boston	1	0	1	Chicago	3	1	2
Worcester	1	0	0	**Kansas**			
New York				Topeka	1	0	0
New York	1	1	3	**Maryland**			
Syracuse	1	0	0	Baltimore	2	1	0
New Jersey				**Virginia**			
Trenton	1	0	1	Roanoke	1	0	0
Pennsylvania				**Georgia**			
Philadelphia	1	0	1	Atlanta	1	0	0
Scranton	1	0	0	**Alabama**			
Ohio				Birmingham	0	0	1
Cincinnati	1	0	0	**California**			
Cleveland	1	0	0	Los Angeles	0	0	1

Encephalitis, epidemic or lethargic—Cases: New York, 2, Philadelphia, 1, Milwaukee, 1. Deaths: Minneapolis, 1.

Pellagra.—Cases: St. Louis, 1, Savannah 1, Birmingham, 2, New Orleans, 1.

Typhus fever.—Cases: New York, 1, Philadelphia, 1, Atlanta, 2, Savannah, 5, Tampa, 1, Birmingham, 2, Montgomery, 7, Lake Charles, 1, New Orleans, 1. Deaths: Tampa, 1.

Rates (annual basis) per 100,000 population for a group of 85 selected cities (population, 1940, 33,591,005)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases
		Cases	Deaths							
Week ended Dec. 13, 1941	18.47	32.91	3.88	109.90	54.17	137.07	0.00	45.17	3.26	178.51
Average for week, 1936–40	21.56	141.19	8.50	198.33	92.08	163.38	2.20	51.47	3.78	168.74

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended November 29, 1941.—During the week ended November 29, 1941, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	- ---	6	1	1	8	1		1		18
Chickenpox	--	20	3	304	336	79	78	41	192	1,053
Diphtheria	--	15	1	24		10	5		1	56
Dysentery				19						19
Influenza		9			4	4			20	37
Lethargic encephalitis							[1] 1			[1] 1
Measles		5	-	707	128	17	29	1	9	896
Mumps	-		-	531	196	34	45	6	128	940
Pneumonia		4			8	2		1	6	21
Poliomyelitis --		1	7		1					9
Scarlet fever	3	14	7	134	293	16	18	28	27	540
Trachoma						1				1
Tuberculosis	5	16	10	74	54	3	1			163
Typhoid and paratyphoid fever		1		5	2					8
Whooping cough		1	2	215	116	10	4	1	46	395

[1] Encephalomyelitis

MALTA

Notifiable diseases—September 1941.—During the month of September 1941, certain notifiable diseases were reported in Malta, including the island of Gozo, as follows

Disease	Cases	Deaths	Disease	Cases	Deaths
Cancer		7	Puerperal fever	6	- --
Cerebrospinal meningitis	2	- -------	Scarlet fever	1	-- --
Chickenpox	3	------	Tetanus		4
Diphtheria	23	2	Trachoma	21	-----
Erysipelas	7	---- --	Tuberculosis (pulmonary)	29	20
Influenza	12	-------	Typhoid fever	62	6
Malaria	2	------	Undulant fever	78	5
Measles	2	------	Whooping cough	59	2
Pneumonia	41	10			

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above named diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

Plague

Argentina.—According to a report dated December 18, 1941, 3 cases of bubonic plague, including 1 suspected case, have occurred in the town of Loberia about 300 miles south of Buenos Aires, Argentina. The report also states that some cases of plague have appeared in Guardia Vieja, Cordoba Province, Argentina.

Yellow Fever

Belgian Congo—Aba.—On December 11, 1941, 1 suspected case of yellow fever was reported in Aba, Belgian Congo.

COURT DECISIONS ON PUBLIC HEALTH

Oleomargarine law construed.—(Tennessee Supreme Court; *Jacobs Packing Co. et al.* v. *Flanery*, 151 S.W.2d 1073; decided June 14, 1941.) Section 2 of a Tennessee statute relating to oleomargarine provided that, for the purpose of the act, certain enumerated products should be known and designated as oleomargarine and further provided that the section should apply to all ingredients essential to and used in the manufacture, mixing, or compounding of oleomargarine. It was also stated that nothing in the section should be construed to mean that shortening should come under the act unless shortening or other similar compound of fats and/or oils was sold with or there was given away with shortening, etc., any article which when mixed with such shortening, etc., made oleomargarine as defined in the act.

A company sold two packaged products labeled as vegetable shortening and vitamin fortifier. The former weighed 12 and the latter 4 ounces and when mixed by the purchaser a pound of yellow oleomargarine was produced. The Tennessee Supreme Court was of the opinion that the statutory language mentioned was intended to and did embrace these two products and that, in view of the construction placed on section 2, it was manifest that the complainants were liable for the license fee stated in section 5, which section required a license of every person desiring to manufacture or sell oleomargarine as defined in section 2.

Section 10 of the statute levied a tax of 10 cents per pound "on all oleomargarine sold in the State as defined in section 2 of this act which

is yellow in color, irrespective of the types or kinds of fats or oil ingredients contained by such yellow oleomargarine, any other provision of this act to the contrary notwithstanding." The supreme court held that under this section the two products above mentioned were subject to the tax of 10 cents per pound and in this connection said: "* * * It will be recalled that section 2, as amended, specifically embraces any two ingredients which when mixed produce oleomargarine. This is exactly what occurs when the two Jelke products are mixed; so that these two products, under the provisions of section 2, are oleomargarine even before they are mixed. And, being oleomargarine, they are of a yellow color, because that color only can be produced by mixing them. It follows that these products are subject to the tax of 10 cents per pound because, by the amendment, they are made yellow oleomargarine. * * *"

The court further held that those engaged in selling the two Jelke compounds were subject to the regulations imposed by sections 3 and 3-A of the statute and stated that the requirements as to advertising, vitamin content, inspection, etc., were reasonable regulations under the police power of the State.

Tax levy for county tuberculosis hospital.—(Illinois Supreme Court; *People ex rel. Smith, County Collector* v. *Wabash Ry. Co. et al.*, 35 N.E.2d 325; decided June 17, 1941.) In a proceeding in which a county collector applied for judgment and sale of real estate for delinquent taxes, one of the objections was to a levy for the county tuberculosis hospital, which tax was in addition to the levy of 25 cents per $100 assessed valuation for general corporate purposes of the county. The basis of the objection was that the county board was without authority to make the said levy in addition to the 25 cents limitation without a vote of the people for such purpose. It appeared that when the hospital was established a number of years before the proposition submitted to the electors of the county under the tuberculosis hospital statute had been for or against the levy of a tax for a hospital. The resolution of the county supervisors relative to the matter said nothing about an addition to the county general corporate purpose tax rate. The holding of the Illinois Supreme Court was that, when a vote was taken under section 2 of the tuberculosis hospital act and the tax mentioned in section 1 of the act was levied, the tax was one for a general corporate purpose and had to be included in the 25 cent rate.

Pneumonia held compensable under workmen's compensation act.—(New Mexico Supreme Court; *Stevenson* v. *Lee Moor Contracting Co. et al.*, 115 P. 2d 342; decided July 7, 1941.) In a proceeding under the New Mexico Workmen's Compensation Act compensation for pneumonia was sought by a truck driver employed by a road building contractor. The employee became ill after operating for a day one of the

avy trucks belonging to his employer. The findings of the trial court, very briefly stated, were that the employee was furnished by his employer with an old, defective truck that emitted excessive gases and fumes (more than any other truck on the job), that the employee breathed such gases and fumes while operating the truck, and that the effect of breathing such gases and fumes was to precipitate "the activity of pneumococci, which resulted in pneumonia." The statute provided for compensation where, among other things, the injury was proximately caused by accident. The supreme court said that the only question was whether the trial court erred in holding, under its findings of fact, that the employee's injury was not "proximately caused by accident" as the phrase was used in the law.

In the majority of cases, said the appellate court, the accident and injury are separate, such as injuries resulting from the breaking of machinery, explosions, etc., but there are many cases in which the accident and injury constitute one happening, such as hernia, blood clots, and hemorrhages, resulting from exertion or strain, and sprained ankle, overheating, sunstroke, breathing dust, freezing, etc. The court's holding was that injury by accident meant nothing more than an accidental injury or an accident as the word was ordinarily used. It denoted an unlooked-for mishap or an untoward event which was not expected or designed.

In discussing the question whether the injury was accidental the court stated that it was not necessary that the injury should result momentarily to be accidental but that it could be "the result of hours, even a day, or longer, of breathing or inhaling gases, depending upon the facts of the case." "If the appellant had been struck in the chest with a stone, the effect of which had been to lower his resistance so that pneumonia resulted, no one would question but that it was an accident. He was struck in the respiratory organs by the finer substance of fumes and gases, with the same effect. We see no material difference in the two causes." As it appeared from the findings of the trial court that the employee was subjected to unusual and extraordinary conditions and hazards, not usual to his employment and to which no other of the workmen on the job was subjected, and that such unusual and extraordinary conditions and hazards were the proximate cause of the attack of pneumonia, the court concluded that the employee's "injury, including that resulting from pneumonia, was an injury by accident" and, therefore, compensable.

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Public Health Reports

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THE SANITATION AND BACTERIOLOGY OF PUBLIC EATING UTENSILS [1]

AN INVESTIGATION OF PUBLIC EATING AND DRINKING ESTABLISHMENTS IN PROVIDENCE, R. I.

By MURRAY P. HORWOOD, Ph. D., *Department of Biology and Public Health, Massachusetts Institute of Technology*, and P. J. PESARE, C. P. H., *Bacteriologist, Rhode Island State Department of Health*

The urbanization of the population together with the tremendous increase in travel by motorcar, by plane, by ship, and by rail, have resulted in a marked increase in public eating and drinking establishments and in the practice of eating away from home. Commensurately, the kitchen and dining room in the individual home have diminished in sanitary significance as the use of public facilities has increased. Today "food and drink come from many sources; they are manipulated by many hands; and they are dispensed to many patrons." Homer N. Calver estimates that the number of people in the United States served in public eating and drinking establishments would be approximately the equivalent of one service, a meal or a drink, per person per day.

The magnitude of the problem is also indicated by the data issued by the United States Bureau of the Census in 1937 in the Census of Business, 1935. These data indicate that there are approximately 300,000 eating and drinking establishments in the United States and that the money value of the sales made at these places amounts to about $2,500,000,000 per year.

TABLE 1.—*Number of independent eating and drinking establishments in Rhode Island and in the United States in 1935 and their sales*

Type of establishment	Total number		Sales	
	United States	Rhode Island	United States	Rhode Island
Restaurants, cafeterias, and lunchrooms	110, 299	520	$1, 239 790 000	$6, 848, 000
Lunch counters and refreshment stands	39, 246	146	185 323 000	783 000
Drinking places	97 929	720	723 554 000	5, 924, 000
Drug stores (having soda fountains)	35 673	300	(1)	(1)
Total	283 147	1, 686	2, 148, 667, 000	13, 555, 000

[1] Data not available.

[1] Read at joint session of Engineering and Food and Nutrition Sections of the American Public Health Association at Atlantic City, October 15, 1911 (Contribution No 195 of the Department of Biology and Public Health, Massachusetts Institute of Technology)

The danger of the common drinking cup was recognized many years ago and its use has been prohibited by public health authorities. The public eating and drinking establishments present, however, far more opportunities for the transmission of infection; and their satisfactory sanitary control represents not only a public health problem of the first magnitude but a problem of public decency as well. Not only are cups and glasses used in common by many people but so are the spoons, knives, forks, and plates. The public health problem is further augmented by the wide variety of foods and drinks which are served. These must be fresh and wholesome to begin with; they must be prepared and handled by individuals free of disease at all times; they must be thoroughly refrigerated before and after preparation; and they must be protected at all times against flies and other insects, against rodents, and against dusts and dirt.

While there is ample evidence of the relationship of infected food, milk, and water to the dissemination of disease, it is more difficult to prove the relationship between methods of dishwashing and the spread of disease in the community.[2] Yet the most glaring sanitary defect observed during the careful inspection of two large military camps in July 1941 was the lack of adequate and satisfactory dishwashing facilities. A visit to numerous restaurants and lunchrooms, especially during the rush periods of the day, will invariably bring conclusive evidence of the seriousness of this outstanding sanitary defect in public eating and drinking establishments. The public health importance of this condition increases materially during epidemics of respiratory disease. For decency as well as for adequate public health protection satisfactory cleansing and sterilization of all eating and drinking utensils in public places should be required and rigidly enforced.

SCOPE OF THE PRESENT INVESTIGATION

Because of the significant relation believed to exist between the sanitation of public eating and drinking places and the public health and because a careful survey of such places in Providence, including the use of a standard score card and laboratory examinations of eating utensils, had never been made, this study was undertaken. The score card employed was a modification of the inspection form used by the New York City Department of Health. In the investigation of methods of dishwashing, information was obtained concerning the facilities available; the temperature of the wash water and rinse water; the time of exposure of the dishes and eating utensils to the germicidal action of hot water or the chemical disinfectant employed; the iden-

[2] A review of the literature and the bibliography employed in the preparation of this paper are omitted here for the sake of brevity

tity of the detergent and disinfectant used; and the method employed in drying and storing cleaned eating utensils.

The laboratory investigation included the determination on eating and drinking utensils of total counts on rabbit blood agar at 37° C. after 48 hours; and the examination of such specimens for specific bacteria, such as *E. coli*, *A. aerogenes*, acid-fast organisms, the organisms of Vincent's infection, hemolytic streptococci, hemolytic staphylococci, and *Corynebacterium diphtheriae*. Controlled laboratory experiments were also conducted in order to determine the essential requirements for the effective chemical sterilization of beverage glasses with chlorine compounds under conditions similar to those obtaining in practice. This phase of the work, however, is not reported here.

In all, 55 public eating and drinking establishments widely distributed throughout Providence were examined in order to obtain a representative sampling of the public eating and drinking establishments in the city. The places examined included 18 restaurants, 8 soda fountain dispensaries, 10 cafes, and 19 barrooms. The investigation was conducted during the summer of 1939 and the lack of positive findings for the presence of respiratory organisms on the eating and drinking utensils may be due to the absence of respiratory disease in epidemic form in the community at that time. Visits were made to the eating and drinking establishments during or immediately after the noon rush period, i. e., from 11:30 a. m. to 2:30 p. m. While proprietors and managers complained about this procedure, it was considered desirable for the purpose of this study to obtain information when the conditions were of maximum public health significance.

Each establishment was visited twice, the two visits being made within 3 to 5 days of each other and without previous warning or notification. The first visit was utilized mainly to obtain the information called for on the score card (see table 2). The occasion was also utilized as an opportunity to educate the manager and employees in the essentials of good sanitation and personal hygiene. The abysmal ignorance of many lay people of the simple requirements of acceptable sanitary practices and good personal hygiene is convincing evidence of the importance of educational procedures in public health engineering activities. Certainly we shall not make suitable progress in correcting the numerous sanitary deficiencies found in public eating and drinking establishments until the personnel involved are enlightened and until their intelligent cooperation is obtained.

The second visit was confined mainly to a detailed study of the dishwashing facilities available and to the methods employed. When chlorine disinfection was employed, the concentration of available chlorine in the rinse water was checked by means of the orthotolidin

test. All necessary samples for the bacteriological examination of dishes, eating utensils, and rinse water were also obtained at this time. The samples were obtained by the multi-swab method recommended by the American Public Health Association.

EXAMINATION OF CULTURES

Examination of blood agar pour plates for hemolytic colonies.—This examination was made at the end of 18 and 48 hours. All hemolytic colonies were picked. Film preparations of the picked colonies were stained by Gram's method.

Those colonies which were suspected of being hemolytic streptococci, as indicated by the microscopic examination and the macroscopic appearance of the colony, were subcultured in 10 ml. of dextrose broth and observed for the characteristic chain formation of Gram-positive streptococci.

Colonies of hemolytic staphylococci were identified directly from the microscopic examination and the macroscopic appearance of the colonies.

Examination of growth on Loeffler's blood serum for the presence of Corynebacterium diphtheriae.—After 24 hours' incubation, a general smear of the growth on the blood serum slant was prepared and stained with Albert's stain. This stained film was examined for the presence of diphtheria bacilli.

Examination of lactose broth cultures.—Those fermentation tubes showing the presence of gas after 24 hours' incubation were recorded as positive presumptive tests for coliform organisms. Those tubes which showed no gas formation were reincubated for another 24 hours. Any tubes showing gas after 48 hours were recorded as doubtful presumptive tests.

The positive and doubtful presumptive tests were confirmed on eosin-methylene-blue agar plates (Bacto-dehydrated Levine's Formula).

Typical *E. coli* colonies appearing on the eosin-methylene-blue agar plates were transferred to agar slants and to lactose broth fermentation tubes. After 24 hours' incubation at 37° C. the lactose broth tubes were observed for gas formation and a film preparation of the agar-slant growth stained by Gram's method was examined for the presence of Gram-negative, non-spore-forming rods typical of *E. coli.*

Those colonies which appeared to be typical of the Aerobacters were transferred to tubes of nutrient broth and incubated at 37° C. for 18 hours, at which time motility tests were performed, to distinguish between the usually nonmotile *Aerobacter aerogenes* and the motile *Bacterium cloacae.*

Total bacterial counts after 48 hours' incubation.—After 48 hours' incubation at 37° C. the blood-agar pour plates were counted with the

RESULTS OF SANITARY INSPECTIONS

Table 2 records the items scored in the sanitary survey of the public eating and drinking establishments included in this study, together with an analysis of the findings for each type of establishment.

TABLE 2.—*Number and percentage of establishments fulfilling the specified sanitary requirements*

Items scored	Soda fountains		Restaurants		Cafes		Bar rooms		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1. Walls, ceilings, and floors										
a. Good repair	7	88.8	16	88.8	8	80.0	14	73.6	45	81.8
b. Clean	7	88.8	14	77.7	6	60.0	4	21.0	31	56.3
c. Oil paint or nonscaling water paint	8	100.0	18	100.0	8	80.0	17	89.4	51	92.7
2. Showcases, windows, and counters										
a. Clean and in good repair	7	88.8	16	88.8	10	100.0	19	100.0	52	94.5
3. Screens										
a. Windows, doors, and other openings adequately screened (April–October)	2	25.0	9	50.0	8	80.0	12	63.0	31	56.3
b. Screen doors are self-closing	2	25.0	9	50.0	9	90.0	12	63.0	32	58.1
c. Excessive numbers of flies absent	3	37.5	7	38.8	5	50.0	4	21.0	19	4.5
4. Toilets										
a. Provided and properly enclosed	7	88.8	17	94.4	10	100.0	17	89.4	51	92.7
b. Conveniently located	5	[illegible]	10	[illegible]	10	100.0	18	94.7	43	78.1
c. Clean and in good repair	[illegible]	[illegible]	8	44.4	4	40.0		26.3	22	40.0
d. Adequately ventilated and lighted	4	50.0	[illegible]	38.8	6	60.0	6	31.5	23	41.8
e. Notice directing employees to wash their hands after use of toilet	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
f. Self-closing door	4	0.0	7	38.8	[illegible]	60.0	6	31	23	41.8
5. Garbage and refuse										
a. Water-tight metal containers	8	100.0	16	88.8	6	60.0	(1)	(1)	30	83.3
b. Refuse adequately stored and disposed of	7	88.8	12	[illegible]	7	70.0	(1)	(1)	26	72.2
6. Storage of foods										
a. Proper receptacles	5	62.0	10	55.5	4	40.0	(1)	(1)	19	52.7
b. At least 2 feet above the floor	5	[illegible]	4	22.2	2	20.0	(1)	(1)	11	30.5
c. Protected against rodents and excreta	4	50.0	[illegible]	[illegible]	2	20.0	(1)	(1)	11	30.5
d. Protected against dust	6	[illegible]	7	38.8	3	30.0	(1)	(1)	16	44.4
e. Protected against insects	[illegible]	[illegible]	7	38.8	3	30.0	(1)	(1)	16	44.4
7. Kitchen, dining room, and storeroom										
a. Adequately lighted	8	100.0	16	88.8	6	60.0	(1)	(1)	30	83.3
b. Adequately ventilated	8	100.0	16	88.8	7	70.0	(1)	(1)	31	86.1
c. Free from rubbish and dirt	6	[illegible]	11	61.1	7	70.0	(1)	(1)	24	66.6
8. Perishable foods and refrigeration										
a. Perishable foods stored at 50° F. or below	[illegible]	75.0	17	94.4	7	70.0	(1)	(1)	30	83.3
b. Refrigerator is clean and in good repair	7	88.0	16	88.8	7	70.0	(1)	(1)	30	83.3
c. Ice box drains into a removable pan	8	100.0	17	94.4	10	100.0	(1)	(1)	35	97.7
d. Conveniently located	8	100.0	17	94.4	10	100.0	(1)	(1)	35	97.7
9. Lockers for employees' clothing										
a. Clean and well ventilated	4	50.0	6	33.3	2	20.0	(1)	(1)	12	33.0
b. Separated from food preparation	5	62.0	8	44.4	3	30.0	(1)	(1)	16	44.4
10. Employees										
a. Health cards available	8	100.0	18	100.0	8	80.0	11	57.8	45	81.8
b. Clean, washable outer garments	8	100.0	14	77.7	6	60.0	16	84.2	44	80.0
c. Clean and neat in appearance	8	100.0	15	83.3	8	80.0	14	73.6	45	81.8
11. Washing facilities										
a. Adequate and conveniently located	[illegible]	88.0	11	61.1	9	90.0	13	68.0	40	72.7
b. Clean and in good repair	7	88.0	11	61.1	8	80.0	11	62.0	37	67.1
c. Clean towel, soap, and running hot water	[illegible]	75.0	8	44.4	6	60.0	3	15.7	23	41.8
12. Miscellaneous										
a. Running hot and cold water	8	100.0	17	94.4	9	90.0	12	63.0	46	83.6
b. Safe and adequate plumbing	8	100.0	18	100.0	10	100.0	19	100.0	55	100.0
c. Apparatus and utensils are clean	7	88.0	10	55.5	8	80.0	12	63.0	37	67.1
d. Ventilating hoods in kitchen	6	75.0	18	100.0	7	70.0	(1)	(1)	31	56.1

[1] Not required.

The following sanitary defects occurred relatively frequently. Unclean walls, ceilings, and floors were common. The windows, doors, and other openings were inadequately screened. The screen doors were not always self-closing Flies were often observed in excessive numbers Toilets were often unclean or in poor repair; they were inadequately lighted and ventilated, and were not provided with self-closing doors In no case was a notice posted requesting employees to wash their hands after using the toilet. The storage of food was unsatisfactory.

TABLE 3 — *Total bacterial counts from public eating utensils after 48 hours on rabbit blood agar at 37° C*

Source	Minimum	Maximum	Mean	Median
18 Restaurants				
Plates	500	1 000 000	300 000	7 500
Tumblers	500	76 000 000	200 000	45 000
Spoons	10	48 000	5 400	1 200
Forks	80	48 000	6 300	9 000
8 Soda fountains				
Plates	300	200 000	37 000	20 000
Tumblers	50	1 300 000	390 000	72 000
Spoons	800	9 000	2 800	1 600
Forks	200	20 000	4 000	1 300
10 Cafes				
Plates	800	200 000	58 000	29 000
Tumblers	4 800	1 000 000	80 000	60 000
Spoons	50	60 000	13 000	1 200
Forks	50	52 000	7 000	1 000
10 Cafe bars				
Beer glasses	10 000	1 200 000	385 000	211 000
Rinse water	1 800	900 000	330 000	132 000
19 Barrooms				
Beer glasses	6 000	70 000 000	7 000 000	13 000 000
Rinse water	8 000	54 000 000	13 000 000	1 900 000

TABLE 4 — *Types of bacteria isolated from eating and drinking utensils and rinse water together with the number and percentage of samples showing the presence of each type*

	Plates	Tumblers	Spoons	Forks	Rinse water	Beer glasses	Number of examinations	Number positive	Percent positive
Escherichia coli	0	1	0	0	1	1	184	3	1.6
Aerobacter aerogenes	15	21	5	0	26	10	184	77	41.8
Acid fast organisms	1	1	1	1	1	1	184	6	3.2
Organisms of Vincent's angina	0	0	0	0	0	0	184	0	0.0
Hemolytic streptococci	1	0	1	0	0	0	184	2	1.1
Hemolytic staphylococci	2	5	1	2	0	0	184	10	5.4
Corynebacterium diphtheriae	0	0	0	0	0	0	184	0	0.0

Predominating organisms 1 *B subtilis* 2 *Staphylococcus albus*

Table 4 records the frequency with which each type of organism for which tests were made was isolated from the eating and drinking utensils and from the rinse water

Completed tests for *E coli* were obtained in only 3 instances, or in 1.6 percent of the samples examined Contamination with *A. aerogenes*, however, occurred very frequently, the organism being

recovered in 41.8 percent of the samples. This may reflect the fact that the organism can be isolated frequently from foods, especially cereal foods. Its presence on washed eating and drinking utensils indicates unsatisfactory dishwashing. *A. aerogenes* may well be considered a suitable index of the quality of dishwashing, just as *E. coli* is regarded as the sanitary index for drinking water. Differential tests made on *aerogenes*-like cultures on E. M. B. agar plates to determine the frequency of *B. cloacae* were all negative.

While acid-fast organisms were recovered in 6 instances, or 3.2 percent of the samples examined, and were obtained from the eating and drinking utensils and rinse waters of 2 of the 55 establishments, guinea pig inoculations for *Mycobacterium tuberculosis* were all negative. The centrifugates showing the presence of acid-fast bacilli were digested with 1–N sodium hydroxide at 37° C. for 20 minutes and then neutralized with 1–N hydrochloric acid. One ml. of each neutralized specimen was then injected subcutaneously into guinea pigs. At the end of 6 weeks the animals were anaesthetized and examined for the presence of typical tuberculous lesions in the inguinal lymph nodes and in the spleen. The results were negative. Histological sections of the spleen also showed no signs of tuberculous pathology. These negative findings, however, should not be interpreted to mean that the danger of tuberculous infection by this route is absent.

Efforts made to recover the spirochete of Vincent's angina from washed public eating and drinking utensils in Providence during the summer months were also negative. Similarly, hemolytic streptococci were isolated only in 2 of the 184 samples examined, or in 1.1 percent of the cases. The colonies on blood agar were small and of the pin-point variety and showed a narrow zone of hemolysis. Subcultured in dextrose broth, they were found to be Gram-positive and to occur in chains having from 6 to 10 cells.

It is possible, perhaps even probable, that if this investigation had been conducted during the winter months, the positive findings of hemolytic streptococci on public eating and drinking utensils would have been very much higher. In 1917, Cumming was able to isolate hemolytic streptococci in 91.1 percent of the specimens examined from 23 sets of tableware. On the other hand, Saelhof and Heinekamp in 1920 isolated hemolytic streptococci from 4 out of 63 eating and drinking utensils examined, a frequency of 6.35 percent. They showed, however, that these hemolytic streptococci were virulent for rabbits and that they corresponded to the human strain.

Hemolytic staphylococci were isolated in 10 of the 184 samples examined, a frequency of 5.4 percent. The organisms were uniformly identified as *Staphylococcus aureus*. In 1920, Saelhof and Heine-

kamp recovered similar organisms in 3.2 percent of the 63 utensils examined, while in 1931, Kuposky isolated hemolytic *Staphylococcus aureus* in 12.7 percent of the 118 samples examined. Since this organism is of public health significance, the frequency with which it can be isolated from public eating and drinking utensils is important.

None of the 184 samples examined for *Corynebacterium diphtheriae* were positive. This may have been due to the seasonal handicap of this investigation and also to the diminishing incidence of diphtheria. From 1912–1921, there was an average annual incidence in Rhode Island of 1,300 cases and 119 deaths from diphtheria. In 1937, however, only 38 cases and 3 deaths from diphtheria were reported. In 1917, Cumming examined 26 sets of tableware for diphtheria bacilli and recovered the organism in 2 percent of the samples. It must also be remembered that diphtheria is a disease of children primarily, who do not frequent public eating and drinking establishments as do adults.

The predominating organisms found on the eating and drinking utensils examined were the hardy organisms, *Bacillus subtilis* (a spore former) and *Staphylococcus albus*. These organisms, which are found in soil and dusts, were probably derived from such sources.

TEMPERATURES OF WASH WATER AND RINSE WATER

Since the temperature of the wash water and the rinse water plays an important role in determining the amount of bacterial pollution left on eating and drinking utensils, this aspect of the subject was included in the investigation. The results observed are recorded in table 5.

TABLE 5.—*Temperatures in degrees F. of wash water and rinse water used for eating utensils in various public eating places*

Source	Minimum	Maximum	Mean	Median	Mode
18 Restaurants					
Wash water	70	[1] 180	114	110	100–109
Rinse water	66	[1] 180	135	145	140–149
8 Soda fountains					
Wash water	120	[2] 212	134	130	120–129
Rinse water	59	[2] 171	94	59	50– 59
10 Cafes					
Wash water	78	[2] 120	92	100	100–109
Rinse water	55	[2] 155	106	134	140–149
10 Cafe bars					
Wash water	68	[2] 112	78	74	60–79
Rinse water	55	[2] 68	61	61	50–69
19 Barrooms					
Wash water	59	[2] 94	70	68	60–69
Rinse water	55	[2] 68	62	64	60–69

[1] Machine washed.
[2] Hand washed.

It is seen from the data recorded in table 5 that even in a modern American city with an excellent record for public health administration and achievement, the sanitation of eating and drinking utensils

in public establishments is far from satisfactory. Most of the dish-washing is still done by hand and the temperatures of the wash water and the rinse water are invariably woefully inadequate either for thorough cleansing or for sterilization. While higher temperatures normally prevail in mechanical dishwashers, this condition is not guaranteed. Where hand washing is employed the wash water is rarely hotter than lukewarm. It is unquestionably more difficult to cleanse soiled dishes and eating utensils with lukewarm water than with hot water. In providing sanitary dishes and eating utensils it is important to concentrate on thorough preliminary cleansing and washing. The final rinse should simply provide insurance of a sanitary utensil. The situation is analagous to the production of clean, wholesome milk to begin with, and then safeguarding its bacterial quality by pasteurization.

The time of exposure of dishes and eating utensils to the germicidal action of hot water or chemical disinfectants varied from 2 to 5 seconds to a period as long as 5 minutes. The average holding time employed in restaurants was 120 seconds; at soda fountains, 55 seconds; at restaurant cafes, 180 seconds; at cafe bars, 10 to 17 seconds; and in barrooms, 6 to 12 seconds.

Providing sanitary dishes and eating utensils in public establishments is not dependent on the temperature of the wash water and rinse water alone. Many other factors enter into the picture, such as the amount and character of the soil, the amount and character of the detergent employed, the thoroughness and duration of the washing and rinsing, the use of dishtowels and their cleanliness, and the conditions under which the dishes and utensils are stored prior to use. However, it is important to remember that cooked dirt is usually harmless, whereas uncooked dirt is not.

The washing of glasses presents a particularly important public health problem, for the unclean, nonsterile glass provides an excellent opportunity for traffic in human saliva and hence for the transmission of infection. In this investigation the beer glasses found in cafes were cleaner and contained fewer bacteria than the beer glasses found in barrooms. In neither case, however, were the glasses considered to be clean and sanitary. Washing and rinsing were performed in cold water. Reliance was placed on a "magic powder" introduced in uncertain and probably inadequate amounts into the wash water from one to three times a day. The chemical composition of the "magic powder" is unknown and is not ascertainable from the label on the original container. Chlorine compounds were used to disinfect beer glasses in only two instances, but the germicidal agent was not used intelligently and tests disclosed the presence of only 10 parts per million of available chlorine. Where chemical disinfection is employed, the glasses should first be thoroughly washed in water

containing a suitable amount of effective detergent at 120° F. After that the glasses should be rinsed in clean, running tap water and then immersed for 2 minutes, or longer, in a solution containing at least 50 parts per million of available chlorine. When freshly prepared, the chlorine solution should contain 100 parts per million of available chlorine and at no time should the chlorine content be allowed to fall below 50 parts per million. The temperature should be maintained between 60° and 80° F. Where chloramine is employed, the concentration used should yield the same germicidal efficiency as the chlorine solutions described. After the glasses have been washed and disinfected in this manner they should be allowed to drain on a suitable drain-shelf which permits the drainage to be removed. Rinsing in cold, running tap water may be left to the discretion of the operator.

Where mechanical or manual washing of dishes and eating utensils is employed the soil should preferably be removed first with the aid of running water at 120° F. This may be facilitated by the use of a clean dish-mop or brush. The utensils should then be washed at 120° F. in clean water containing an adequate amount of a suitable detergent at all times. After that the utensils should be rinsed for at least 2 minutes in clean water at a temperature not less than 170° F. The utensils should then be allowed to drain and dry, preferably without wiping, and then stored where they will be free of contamination from dust, dirt, insects, rodents, and humans. Glasses should be treated the same way. It is usually necessary, however, to wipe the glasses with a clean, linen towel while they are hot. Single service paper containers of suitable quality which have been effectively protected against contamination may be substituted for the glasses, dishes, and eating utensils wherever possible. Such containers after use, like other utensils, should be freed of organic matter by rinsing in running water and stored in a satisfactory manner until collected or destroyed.

CONCLUSIONS

1. A thorough sanitary survey of public eating places coupled with the bacteriological examination of dishes and eating utensils may serve as an excellent basis on which to formulate an effective campaign of education leading to improvement in the sanitation of public eating establishments.

2. Ignorance of accepted sanitary requirements and procedures as manifested by the managers and employees of public eating and drinking establishments appeared to be the most important single cause of insanitary practices in such places. It seems evident that the public health engineering profession is not utilizing education adequately as a tool to improve sanitary conditions and practices in public eating and drinking establishments.

3. The health card required of all employees in public eating and drinking establishments, as now issued, has degenerated into a mere formality and as such is of no practical significance. This requirement should, therefore, be repealed.

4. There is no correlation between high temperature of rinse water and low bacterial counts of utensils ready for use since a temperature of 170° F. or more is only one of many factors which influence the bacterial counts. Other important factors are (*a*) the length of time the utensils are exposed to the hot water; (*b*) the composition and amount of detergent; (*c*) the thoroughness of preliminary washing and removal of the soil; (*d*) the method of drying the washed utensils; (*e*) the method of handling and storing washed utensils and their protection against dust, dirt, insects, rodents, and human contamination.

5. The temperatures of the wash waters and rinse waters observed were universally too low to insure the effective disinfection of eating and drinking utensils.

6. The period of exposure of eating and drinking utensils to the germicidal action of hot water or of chemical disinfectants was extremely variable and in most instances far too short to insure effective disinfection.

7. The swab-multiple-utensil method of examination is a practical and reasonably effective means of determining the bacteriological condition of eating and drinking utensils.

8. The total count is a satisfactory index of the sanitary efficiency of the methods employed in washing, disinfecting, handling, and storing eating and drinking utensils.

9. There is no correlation between high total counts and the presence of specific pathogenic organisms.

10. Concerning the specific types of bacteria found on eating and drinking utensils this study showed that:

(*a*) *E. coli* may be carried by such utensils.

(*b*) *A. aerogenes* may be isolated frequently.

(*c*) Few, if any, of the organisms associated with Vincent's angina are able to resist the customary dishwashing and glasswashing procedures when the infection is not prevalent in epidemic form.

(*d*) Hemolytic streptococci and staphylococci can be readily recovered from public eating and drinking utensils.

(*e*) Under present conditions of diphtheria incidence, the diphtheria bacillus is not readily isolated from public eating and drinking utensils.

(*f*) Acid-fast bacteria, not identified as *Mycobacterium tuberculosis*, can be and are carried by public eating and drinking utensils.

(*g*) *B. subtilis* and *Staphylococcus albus* were found to be the most frequent contaminants of public eating and drinking utensils.

11. A concentration of 50 parts per million of available chlorine acting for 15 seconds was found to be sufficient to effect a reduction of 99.9 percent in the bacterial counts of beverage glasses artificially contaminated with *Staphylococcus aureus* and *Aerobacter aerogenes* when the glasses are freed of organic matter before immersion in the chlorine rinse solution at a temperature of 59° F. The pH of the tap water used to prepare the chlorine rinse solution was 9.3.

12. Ninety percent of the bartenders do not employ the heat-treatment method of disinfecting beverage glasses. Most of them depend on the magic effects of some soap powder of unknown chemical composition acting only for a period varying from 6 to 12 seconds.

13. The use of chlorine compounds for the disinfection of beverage glasses under controlled conditions and in a satisfactory manner can be made a practical and effective method of providing clean and relatively sterile glasses in public drinking places. However, most of the establishments using chlorine disinfection at present are guilty of gross misuse of this procedure.

14. The single service paper container or utensil of good quality, which is also protected against human, animal, insect, and atmospheric contamination, as required of all utensils and containers, can be employed as a sanitary substitute for glasses, cups, and other utensils that are not clean or safe. After use, paper containers should be rinsed free of all organic matter, wherever possible, and then stored properly until collected and destroyed. Where paper containers or utensils are destroyed promptly by incineration, rinsing to remove organic matter may be unnecessary. No paper container or utensil used for food or drink should be used more than once.

ANTITULAREMIC SERUM[1]

By Edward Francis, *Medical Director (Retired)*, and Lloyd D Felton, *Senior Surgeon, United States Public Health Service*

Foshay's advocacy in numerous articles[2] of antitularemic serum for the treatment of tularemia in man has prompted the renewal of our search for specific protective bodies in antitularemic serum. The presence of high titer protective antibody in immune serum is essential for satisfactory action against pneumococcus and meningococcus infections. As far as known, protective antibody is the only agent which brings about curative action following passive transfer of any immune serum. Thus it would seem logical in the case of *Bacterium tularense* to establish whether or not a protective serum could be developed as measured in experimental animals. In other words,

[1] From the Division of Infectious Diseases, National Institute of Health.

[2] See especially reference 3

until it is proved that *B. tularense* is unlike other bacteria in this respect, only from immune serum containing adequate protective antibodies would successful treatment be anticipated. The fact that apparently lasting immunity follows the infection in man suggests the feasibility of producing some form of curative serum in experimental animals.

It is our purpose to report results of tests on the protective activity of so-called antitularemic horse serum, and also results of attempts to produce protective serum in sheep and rabbits by methods similar to those used successfully in the production of antipneumococcus and antimeningococcus serums. Modifications were needed because of the toxicity of highly virulent *B. tularense* cultures.

METHODS

Growth and virulence of culture.—It is essential in making potency tests to use only a culture which is of maximum virulence. Such a culture will kill rabbits, guinea pigs, and white mice at the same high point of dilution, irrespective of the enormous differences in weight of the three species. For that reason each test for serum potency is preceded by a control test of the virulence of the experimental culture for the three species. Stock cultures which have been carried in the laboratory solely on culture medium lose some virulence in time and their diminished virulence first shows itself in failure to kill rabbits. Such a culture should be discarded for testing in favor of one of maximum virulence.

The minimal fatal dose for mice of a culture of maximum virulence can be determined with satisfactory constancy by making a series of increasing dilutions of the culture to a point where it will no longer kill. The steps to be followed are: A 24-hour growth of the culture on blood-glucose-cystine agar is prepared. One small loopful of the solid growth is suspended in 1 cc. of saline solution and thoroughly broken up by suction and expulsion in and out through the small opening of a fine capillary pipette. This first suspension will be of varying turbidity and must be diluted by the addition of repeated amounts of 1 cc. of saline solution until it has the standard turbidity of 500, corresponding to 500 parts per million of the silica standard.

In practice the standard turbidity of 500 can be attained quickly with satisfactory accuracy by repeated viewing of the letters of 10 point printer's type in strong diffused daylight through a thin-walled glass agglutination tube of 10 mm. diameter filled with the suspension to be standardized. Too great turbidity will render the letters illegible. Too slight turbidity will render the letters too easily read. A turbidity of 500 will just permit the letters to be made out correctly with difficulty (preferably when the words are spelled backward).

One cc. of a culture of 500 turbidity is the starting point for determining the M. L. D. of a culture (see the first line of each table). Seven cylinders each containing 99 cc. of saline solution and seven sterile pipettes of 1 cc. capacity are the equipment for making the dilutions of 10^{-2} or 0.01 cc., 10^{-4} or 0.0001 cc., 10^{-6} or 0.000001 cc., etc., to 10^{-14}. The dilution 10^{-8} when injected in 0.5 cc. or 1.0 cc. amounts is seen from the tables to constitute the M. L. D. of a fully virulent culture.

Cultures of maximum virulence have been used for immunization in this group of experiments. Slight variations in the technique occurred as noted in each experiment. The culture medium was the same throughout and consisted of the usual blood-glucose-cystine agar in Blake bottles.

Assay of protective titer.—The method was essentially that used for titrating antipneumococcus serum in white mice. Most of the tests were carried out by mixing equal volumes of a standardized virulent culture with immune serum, allowing the mixture to stand at room temperature for 1 hour, and then injecting 1 cc. intraperitoneally. Some tests were run by injecting 0.5 cc. of test culture followed immediately by 0.5 cc. of serum. Eight mice were used for each culture dilution. End points were calculated from the average survival time of the mice.

Serum concentration.—The methods used in concentrating the various serums were those applied to antipneumococcus horse and rabbit serums (*1*, *2*). These included salting out with ammonium sulfate, or sodium sulfate, and also precipitation with alcohol. It is noteworthy that, unlike antipneumococcus serum, agglutinins were associated in great part with the fraction precipitated with 12 to 14 percent of anhydrous sodium sulfate, and 25 to 30 percent of saturation with ammonium sulfate. Contrariwise, in the alcohol method, complete precipitation of agglutinins occurred only after increasing the concentration of alcohol to 30 to 40 percent. Rabbit serums required somewhat higher concentrations of alcohol than sheep serums. In general the results show the possibility of concentrating the agglutinins with apparently no loss. The protein concentration is relatively low so that actually agglutinins could be concentrated at least twentyfold.

ANTITULAREMIC HORSE SERUM

Mulford Biological Laboratories manufacture and sell an antitularemic serum prepared from horses. The serum is marketed in two forms; one form consists of a package of 30 cc. of original liquid horse serum and the other represents a dried lyophilized concentrate of 30 cc. of horse serum. The commercial packages do not contain statements of potency value.

Potency tests of antitularemic horse serums are presented in table 1. Each test in the column headed 10^{-8} shows the average duration of life of mice, in hours, following injection of the minimal lethal dose of the culture of *Bacterium tularense.* The M. L. D. for mice of cultures of maximum virulence is seen to be 0.5 cc. injected intraperitoneally of a dilution of 10^{-8} or 0.00000001 cc. of a culture having a turbidity of 500. The antiserums in 0.5 cc. amounts were either mixed with 0.5 cc. of the M. L. D. of culture for 1 hour before injection, or the injection of culture was followed immediately by the injection of the serum.

The effect of the serum is judged by its ability to save the life of the mice or to increase the interval (number of hours) before death. In the vertical column headed 10^{-8} in table 1 it may be seen that none of the serums prevented death but that all increased the average length of life over that of the culture controls by an excess of time expressed in percentage of the culture control time.

The last item of table 1 is a test of five bleedings of horse No. 2 which was injected with living cultures of maximum virulence in 1924. This horse received 17 subcutaneous injections between April 1, 1924, and November 5, 1924. Five of the bleedings made in 1924 had agglutinin titers at that time of 640, 160, 160, 320, and 160, respectively. The same serums on August 8, 1940, had agglutinin titers, respectively, of 160, 160, 80, 80, and 40. Five sets of mice tested August 8, 1940, against the five 16-year-old serums stored at 5° C. without preservative, all died.

In this test, although no mice lived, with old or new horse immune serum the average increase in life of the animal as compared to the control varied from 28 to 59 percent; with normal horse serum the increase was 11 percent. It may be observed that the agglutinins in old serums were low as compared to those in new serums.

ANTITULAREMIC SHEEP SERUM

A male sheep, 11 months old, which had been stained blue for identification purposes, was subjected to three series of injections during the 13-month period from January 13, 1940, to February 19, 1941, the first series being with living virulent cultures injected subcutaneously, and the second and third series being with formalin-killed cultures injected intravenously. A second sheep, which was white, received only the first and second series of injections.

First series of injections.—Five injections subcutaneously on the abdomen with living virulent cultures of *Bacterium tularense* were given at monthly intervals during the 4-month period from January 13, 1940, to May 17, 1940. The inoculum was freshly prepared for each injection and consisted of a mixture of six platinum loopfuls of solid

TABLE 1.—*Antitularemic horse serum*

(1) Tested July 29, 1939 1 cc culture V 25-38-39, turbidity 500, diluted	10^{-6}	10^{-8}	10^{-10}	10^{-12}.
Control, 6 mice I P 0 5 cc. culture	----------	Average 85 hrs	1 died 5 lived	1 died. 5 lived.
Mulford antitularemic liquid horse serum No. 40540-1, No 98520 Expiration date Jan 12, 1940 Tularense agglutination titer 1 640. 6 mice I P 0 5 cc serum was followed immediately by 0.5 cc I. P culture 10^{-8}, 10^{-10}, or 10^{-12}.	----------	Average 109 hrs = 28 percent longer than culture controls	2 died 4 lived	1 died. 5 lived.
(2) Tested Nov 29, 1939 1 cc culture Pack turbidity 500 diluted	10^{-6}	10^{-8}	10^{-10}	10^{-12}.
Control rabbit S C 1 cc culture	Dead 5 days	Dead 5 days	1 died 1 lived	Lived.
Control guinea pig S C. 1 cc culture	Dead 5 days	Dead 5 days	1 died 1 lived	Lived.
Control 8 mice I P 0 5 cc culture	Average 69 hrs	Average 91 hrs	1 died 7 lived	
Mulford antitularemic lyophilized dried horse serum No 40211-1 Expiration date Oct 24, 1944. Tularense agglutination titer 1 1280 8 mice I P. 0 5 cc culture was followed immediately by 0.5 cc I P of dissolved serum	Average 101 hrs = 46 percent longer than culture controls	Average 145 hrs. = 59 percent longer than culture controls	8 lived	
Same as above except that 4 cc. of dissolved serum was mixed with 4 cc culture 10^{-8} and after standing 1 hr R T was injected 1 cc I. P into each of 8 mice	----------	Average 144 hrs = 59 percent longer than culture controls	----------	
(3) Tested Aug 8, 1940 1 cc culture Pack R R B turbidity 500 diluted.	10^{-6}	10^{-8}	10^{-10}	10^{-12}.
Control rabbit S C 1 cc culture	Dead 11 days	Lived	----------	
Control guinea pig S C 1 cc culture	Dead 6 days	Lived	Lived	Lived.
Control 8 mice I. P. 0 5 cc. culture.	Average 78 hrs	Average 94 hrs	2 died 6 lived	
Mulford antitularemic lyophilized dried horse serum No 143085. Expiration date July 1, 1945 Agglutination titer 1 640. 4 cc dissolved serum+4 cc culture 10^{-8}. Mixture 1 hr R T. 8 mice I P 1 cc of mixture	----------	Average 149 hrs = 58 percent longer than culture controls.	----------	
Normal horse serum 4 cc serum + 4 cc culture 10^{-8} Mixture 1 hr R T 8 mice I. P. 1 cc of mixture	----------	Average 100 hrs = 11 percent longer than culture controls.	----------	
Francis antitularemic horse No 2 serum, 5 bleedings made in 1924 were tested Aug 8, 1940. 4 cc serum +4 cc culture 10^{-8} Mixtures 1 hr. R. T. 8 mice I P. 1 cc of mixture.	Bled May 6, 1924	Average 131 hrs = 39 percent longer than culture controls		
	Bled June 6, 1924	Average 140 hrs = 49 percent longer than culture controls		
	Bled July 28, 1924	Average 141 hrs. = 50 percent longer than culture controls.		
	Bled Sept 26, 1924	Average 140 hrs = 49 percent longer than culture controls.		
	Bled Nov 19, 1924.	Average 148 hrs = 57 percent longer than culture controls.		

24-hour growth, one loopful being taken from each of six slants of living cultures, all of maximum virulence—Pack, Hop, A S, M F, Tull, and N J—all isolated between September and December 1939. Each injection of the sheep caused illness of 24 hours' duration, accompanied by elevation of temperature and loss of appetite. The blood

clots of each bleeding were injected into a group of guinea pigs for evidence of bacteremia, but the animals all remained well except in one instance; the blood taken from the blue-stained sheep on April 27, 1940, caused the death of 1 of 6 guinea pigs with typical lesions of tularemia. Preliminary to each monthly injection, tests of the sheep's serums were made for tularense agglutinins and for potency. The five agglutination titers of the blue-stained sheep progressed from 0 to 5120, 2560, 1280, and 1280. Five agglutination titers of the white sheep progressed from 0 to 1280, 320, 160, and 160. Potency tests of the monthly bleedings were made on white mice with the result that, while none showed complete protection, the average survival time was longer than in control mice.

Second series of injections.—Six intravenous injections were given at weekly intervals between July 19, 1940, and August 23, 1940, from a formalinized pool of six cultures made July 16, 1940. The pool had a turbidity of 20,000, i. e., 1 part in 40 parts of saline solution gave a turbidity of 500. The inoculation dose of the concentrated pool varied, increasing from 0.3 cc. on July 19, 1940, to 2.0 cc. on August 23, 1940. The pool was made from 3-day growths on six Blake bottles each of which had been inoculated with one of the above-mentioned six cultures of maximum virulence. The growth was taken off in distilled water containing 0.4 percent formalin

TABLE 2.—*Antitularemic sheep serums bled Aug. 29, 1940, after second series of injections*

(1) Tested Sept. 23, 1940 1 cc. culture Pack R. R. B. turbidity 500 diluted	10^{-6} ---------	10^{-8} ----- ----	10^{-10}
Control rabbit S. C. 1 cc. culture	Lived	Lived	Lived
Control guinea pig S. C. 1 cc. culture	Dead 7 days	Lived	Lived
Control 8 mice I. P. 0.5 cc. culture	Average 84 hrs	Average 117 hrs	1 died 7 lived
Blue sheep bled Aug. 29, 1940. Not concentrated Tularense agglutination titer 1:5120 4 cc. serum+4 cc. culture 10^{-8} Mixture stood 1 hr. R. T. 8 mice I. P. 1 cc. of mixture	-	Average 156 hrs.=33 percent longer than culture controls	
Blue sheep bled Aug. 29, 1940. Concentrated Tularense agglutination titer 1:2560 4 cc. concentrated serum+4 cc. culture 10^{-8} Mixture stood 1 hr. R. T. 8 mice I. P. 1 cc. mixture	-- -	Average 179 hrs.=53 percent longer than culture controls.	
White sheep bled Aug. 29, 1940. Not concentrated Tularense agglutination titer 1:2560 4 cc. serum+4 cc. culture 10^{-8} Mixture stood 1 hr. R. T. 8 mice I. P. 1 cc. mixture.	--	Average 162 hrs.=38 percent longer than culture controls	
White sheep bled Aug. 29, 1940. Concentrated Tularense agglutination titer 1:2560 4 cc. concentrated serum+4 cc. culture 10^{-8} Mixture stood 1 hr. R. T. 8 mice I. P. 1 cc. mixture	-	Average 175 hrs.=49 percent longer than culture controls	

Bleedings on August 29, 1940, took 1,000 cc. of blood from the jugular vein of each sheep for potency test. The tularense agglutination titer of the blue-stained sheep was positive 1:5120 and of the white sheep 1:2560. Transcript of one of these potency tests is presented in table 2, in which the column headed 10^{-8} records the average prolongation of life of mice ascribable to the serums, respectively 33 percent and 38 percent in excess of the culture control.

Third series of injections.—Twelve intravenous injections were given to the blue-stained sheep between January 9 and February 19, 1941, from a formalinized pool of nine cultures made December 19, 1940, and which had a turbidity of 7,500, i. e., 1 part in 15 of saline solution gave a turbidity of 500. The pool was made from 3-day growths on nine Blake bottles each of which had been inoculated with one of the above-mentioned six cultures or one of three additional cultures of maximum virulence (Ra, Van, or Beld) which had been isolated from man between August and November 1940. The growth was taken off in 0.4 percent formalin, thrown down in centrifuge, and taken up in 0.4 percent formalin. The following schedule of the third series of injections of the blue-stained sheep consists of four sets of injections spaced 10 days between sets. Each set consists of three daily injections and the dosage for each set is larger than in the preceding set.

Jan. 9, 1941	2 0 cc. of the pool made Dec. 19, 1940.
Jan 10, 1941	Do.
Jan. 11, 1941	Do.
Jan. 21, 1941	3.0 cc. of the pool made Dec. 19, 1940.
Jan. 22, 1941	Do.
Jan. 23, 1941	Do.
Feb. 3, 1941	6.0 cc. of the pool made Dec. 19, 1940.
Feb. 4, 1941	Do.
Feb. 5, 1941	Do.
Feb. 17, 1941	9.0 cc. of the pool made Dec. 19, 1940.
Feb. 18, 1941	Do.
Feb. 19, 1941	Do.

Bleedings were made from the blue-stained sheep on March 1, 1941, and on May 1, 1941, following the third series of injections. On March 1, 1941, 2,000 cc. taken from the external jugular vein had a tularense agglutination titer of 1:2560 and its potency is recorded in table 3. On May 1, 1941, 1,800 cc. taken from the external jugular vein had a tularense agglutination titer of 1:1280 and its potency against infection in mice is recorded in table 3. It will be noted that concentration of the serum raised its tularense agglutinin titer from 1280 to 10240. As in the preceding tables the significant points of table 3 are seen in the column headed 10^{-8} giving the percentage prolongation of life due to serums as 11 percent and 35 percent with the unconcentrated serum, and 44 percent with the latter serum concentrated.

TABLE 3.—*Antitularemic serum of blue sheep bled after third series of injections*

(1) Bled Mar 1, 1941 tested Mar 4 1941 1 cc culture Broo turbidity 500 diluted Control rabbit S C 1 cc culture Control guinea pig S C 1 cc culture Control 8 mice I P 0 5 cc culture	10^{-6} ---------- Dead 5 days Average 68 hrs	10^{-8} Dead 6 days Dead 6 days Average 82 hrs	10^{-10} Lived Lived 2 died 6 lived
Blue sheep bled Mar 1, 1941 Not concentrated Tularense agglutination titer 1 2560 4 cc serum+4 cc culture 10^{-8} Mixture stood 1 hr R T 8 mice I P 1 cc mixture	-----------	Average 91 hrs = 11 percent longer than culture controls	
(2) Bled May 1 1941 tested May 1 1941 1 cc culture Broo turbidity 500 diluted Control rabbit S C 1 cc culture Control guinea pig S C 1 cc culture Control 8 mice I P 0 5 cc culture	10^{-6} Dead 6 days Average 71 hrs	10^{-8} Dead 6 days Dead 6 days Average 93 hrs	10^{-10} Lived Lived 2 died 6 lived
Blue sheep bled May 1 1941 Not concentrated Tularense agglutination titer 1 1280 4 cc serum+4 cc culture 10^{-8} Mixture stood 1 hr R T 8 mice I P 1 cc mixture		Average 126 hrs = 35 percent longer than culture controls	
(3) Bled May 1 1941 tested May 16 1941 1 cc culture Broo turbidity 500 diluted Control rabbit S C 1 cc culture Control guinea pig S C 1 cc culture Control 8 mice I P 0 5 cc culture	10^{-6} Dead 5 days Average 67 hrs	10^{-8} Dead 8 days Dead 8 days Average 79 hrs	10^{-10} Dead 10 days Dead 8 days 1 died 7 lived
Blue sheep bled May 1 1941 Concentrated 6 times 4 cc concentrated serum+4 cc culture 10^{-8} Mixture 1 hr R T 8 mice I P 1 cc mixture (Concentration raised the agglutinin titer from 1280 to 10240)		Average 111 hrs = 41 percent longer than culture controls	

ANTITULAREMIC RABBIT SERUMS

During the 4-month period from January 15, 1940, to May 23, 1940, 20 Belgian hares were given, as a group, three series of intravenous injections with formalinized virulent cultures of *Bacterium tularense* There were 20 survivors through the first series of injections, 14 through the second series, and 10 through the third series. A bleeding for potency testing was made at the end of each series of injections

First series of injections—Twenty rabbits were injected intravenously with formalin-killed cultures on January 15, 20, 25, and 29, 1940. Each inoculum was 2 cc of 500 turbidity of a pool of 24-hour growth of six cultures of maximum virulence—M F, A S, Tull, Hop, N J, and Pack which were killed with 0 4 percent of formalin. Fifty cc of blood was removed from the heart of each rabbit on February 2, 1940, and the individual agglutination titers were 640 in 1 rabbit; 1280 in 7, 2560 in 11, and 5120 in 1 The pooled serum of 400 cc was tested for potency on white mice in concentrated and unconcentrated form, as shown in table 4, which gives the essential data in the column headed 10^{-8}.

TABLE 4.—*Antitularemic pooled rabbit serums bled Feb 2, 1940, after first series of injections*

(1) Tested Feb 8 1940 1 cc culture Pack R turbidity 500 diluted	10^{-6}	10^{-8}	10^{-10}	10^{-12}
Control rabbit S C 1 cc	Dead 3 days	Dead 6 days	Dead 7 days	Lived
Control guinea pig S C 1 cc	Dead 5 days	Dead 6 days	Dead 8 days	Do
Control 8 mice I P 0 5 cc culture	Average 62 hrs	Average 91 hrs	1 died, 7 lived	
20 rabbits bled Feb 2, 1940 Not concentrated Agglutination titer 1 2560 4 cc pooled serum+4 cc culture 10^{-6} 10^{-8} or 10^{-10} Mixtures 1 hr R T 8 mice I P 1 cc of mixture	Average 103 hrs = 66 percent longer than culture controls	Average 128 hrs = 41 percent longer than culture controls	1 died, 7 lived	
(2) Tested May 8 1940 1 cc culture Pack R R B turbidity 500 diluted	10^{-6} .	10^{-8}	10^{-10} . .	10^{-12}
Control rabbit S C 1 cc		Dead 7 days	Lived ---	
Control guinea pig S C 1 cc	Died 9 days	Dead 6 days	Lived	Lived
Control 8 mice I P 0 5 cc culture	Average 66 hrs	Average 80 hrs	Lived	
20 rabbits bled Feb 2 1940 Concentrated 6 times Agglutination titer 1 5120 4 cc concentrated serum+4 cc culture 10^{-6} 10^{-8} or 10^{-12} Mixtures stood 1 hr R T 8 mice I P 1 cc of each mixture	Average 99 hrs = 50 percent longer than culture controls	Average 115 hrs = 40 percent longer than culture controls	1 died, 7 lived	
Same as above except that each mouse received only 1/6 cc of concentrated serum instead of 0 5 cc		Average 1[illegible] hr = 5[illegible] percent longer than culture controls		
20 rabbits bled Feb 2 1940 Not concentrated Agglutination titer 1 2560 8 mice received I P 1/2 cc serum+1/2 cc culture 10^{-8} after mixture stood 1 hr at R T		Average 117 hrs = 46 percent longer than culture controls		
(3) Tested May 22 1940 1 cc culture Pack R R B turbidity 500 diluted	10^{-6}	10^{-8}	10^{-10}	10^{-12}
Control rabbit S C 1 cc		Dead 6 days	Lived	
Control guinea pig S C 1 cc	Dead 5 days	Dead 6 days	Dead 12 days	Lived
Control 8 mice I P 0 5 cc culture	Average 70 hrs	Average 80 hrs	3 died, 5 lived	
20 rabbits bled Feb 2 1940 Concentrated 6 times 4 cc concentrated serum+4 cc culture 10^{-6} 10^{-8} or 10^{-10} Mixtures stood 1 hr R T 8 mice I P 1 cc of each mixture (In addition the 10^{-8} group received 1/4 cc concentrated serum I P May 23, 24 25, and 26)	Average 85 hrs = 21 percent longer than culture controls	Average 112 hrs = 40 percent longer than culture controls	1 died 7 lived	
20 rabbits bled Feb 2, 1940 Not concentrated Agglutination titer 1 2560 4 cc pooled serum+4 cc culture 10^{-6} 10^{-8} or 10^{-10} Mixtures stood 1 hr R T 8 mice I P 1 cc of each mixture	Average 106 hrs = 51 percent longer than culture controls	Average 138 hrs = 72 percent longer than culture controls	1 died, 7 lived	

Second series of injections—Intravenous injections of 14 of the above 20 rabbits with formalin-killed cultures were done on February 15, 19, 27, March 4 and 11, 1940 Each inoculum was the same as in the first series of injections Five cc of blood was taken from the

ear of each of the 14 rabbits on March 15, 1940, the individual agglutination titers being 320 in 4 rabbits, 640 in 6, 1280 in 3, and 2560 in 1. The pooled serum had a tularense agglutination titer of 1:1280 and was tested for potency in mice on March 17, 1940, as shown in table 5 (see column headed 10^{-8}).

TABLE 5.—*Antitularemic pooled rabbit serums bled Mar 15, 1940, after second series of injections*

(1) Tested Mar 17, 1940 1 cc culture Pack R turbidity 500 diluted	10^{-6}	10^{-8}	10^{-10}	10^{-12}
Control rabbit S C 1 cc culture	Dead 5 days	Died 6 days		
Control guinea pig S C 1 cc culture	Dead 6 days	Dead 7 days	Dead 11 days	Lived
Control 8 mice I P 0 5 cc culture 10^{-6}, 10^{-8} or 10^{-10}	Average 103 hrs	Average 114 hrs	8 lived	
14 rabbits bled Mar 15, 1940, after second series Pooled serum had tularense titer 1 1280 8 mice I P 1 cc pooled serum was followed immediately by 0 5 cc culture S C	Average 120 hrs = 16 percent longer than culture controls	Average 199 hrs = 75 percent longer than culture controls	8 lived	
Normal rabbit serum 8 mice I P 1 cc normal serum was followed immediately by 0 5 cc culture S C	Average 120 hrs = 16 percent longer than culture controls	Average 178 hrs = 56 percent longer than culture controls	3 died 5 lived	

TABLE 6.—*Antitularemic rabbit serums bled June 3, 1940, after third series of injections*

(1) Tested June 13 1940 1 cc culture Lock R R B turbidity 500 diluted	10^{-6}	10^{-8}	10^{-10}	10^{-12}
Control rabbit S C 1 cc culture		Died 6 days	Lived	
Control guinea pig S C 1 cc culture	Dead 6 days	Dead 6 days	Lived	Lived
Control 8 mice I P 0 5 cc culture 10^{-6}, 10^{-8} or 10^{-10}	Average 82 hrs	Average 90 hrs	2 died 6 lived	
10 rabbits bled June 3, 1940, after third series Pooled serums not concentrated Tularense agglutination titer 1 320 4 cc serum+4 cc culture 10^{-8} Mixture 1 hr R T 8 mice I P 1 cc mixture		Average 131 hrs = 45 percent longer than culture controls		
Same as above but Concentrate (A) Agglutination titer 1 640 8 mice I P 1 cc of mixture		Average 146 hrs = 62 percent longer than culture controls		
Same as above but Concentrate (B) Agglutination titer 1 640 8 mice I P 1 cc of mixture		Average 140 hrs = 55 percent longer than culture controls		

Third series of injections.—Fourteen intravenous injections of 10 of the original 20 rabbits with formalinized cultures were made at 4-day intervals between March 25 and May 23, 1940. Each inoculum was the same as in the first series of injections, except that for the last six

injections the amount was increased fivefold to 2 cc. of 2,500 turbidity. The 10 rabbits were bled to death on June 3, 1940, the individual tularense agglutination titers being 640 in 3 rabbits, 320 in 1, and 160 in 6. The pooled serum (400 cc.) had a tularense titer of 1:320 and was tested for potency before and after concentration as reported in table 6.

As shown in tables 4, 5, and 6, after each of the three series of injections, both concentrated and unconcentratedse rums prolonged the life of the experimental animal over that of the control, but no complete protection occurred.

ANTITULAREMIC HUMAN SERUM

Convalescent serum from recovered cases of tularemia has been used for treatment in several severe cases of the disease but it has not proved of value. A test is reported in table 7 in which convalescent serum from patient Pack was tested in mice against culture Pack. Onset of illness in the patient occurred on August 22, 1939. He developed severe lobar pneumonia and *Bacterium tularense* was isolated daily, by guinea pig inoculation, from his sputum from the twenty-sixth to the thirty-eighth days of illness. Blood serum obtained on November 30, 1939, had a tularense agglutination titer of 1.320 and was used for the test reported in table 7. By reading the vertical column 10^{-8} of table 7 it is seen that the serum had no effect on the culture.

TABLE 7.—*Antitularemic human serum*

(1) Tested Dec 8, 1939 1 cc culture Pack turbidity 500 diluted	10^{-6}	10^{-8}	10^{-10}	10^{-12}.
Control rabbit S C 1 cc culture	Dead 6 days	Dead 7 days	Lived	Lived.
Control guinea pig S C 1 cc culture	Dead 6 days	Dead 6 days	Lived	Lived
Control 8 mice I. P. 0 5 cc. culture	8 died	3 died 5 lived	8 lived -	
Pack human serum, bled November 30, 1939 Tularense agglutination titer 1 320 4 cc serum+4 cc culture 10^{-8} Mixture 1 hr R T 8 mice I P 1 cc of mixture	-	6 died 2 lived	- -	
Same as above, except that in 8 mice I P 0 5 cc culture 10^{-8} was followed immediately by 0 5 cc serum I. P.	-	8 died	-	

DISCUSSION AND SUMMARY

It is seen from the above experiments that, by the methods used, protective antibody was not produced in sheep or rabbits against *B. tularense*. A concentration of the serum, at least as measured by

the agglutinin titer, was accomplished without loss as compared to the original serum. However, even with serum thus concentrated life of the average mouse was not prolonged significantly more than with the unconcentrated serum. This same observation was made with different unconcentrated serums, irrespective of variation in agglutinin titer. It is thus seen that protective antibody against *B. tularense* is not necessarily associated with agglutinin titer.

It may be concluded from this study of the antitularemic serums prepared from horses, sheep, and rabbits, and one convalescent human serum, herein reported, that no evidence of protective antibody as measured in white mice was observed. There was a significant increase in the survival time of the mice injected with the serum over that of the control culture mice, but actual survival of the mice inoculated with both serum and 1 to 10 lethal doses of the organism did not occur. The greatest prolongation of life, as expressed in percentages, was 75 percent, and the lowest 11 percent more than the control. However, with one sample each of normal horse and normal rabbit serums, life was prolonged 11 percent and 56 percent, respectively. The human convalescent serum did not protect mice.

REFERENCES

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(*2*) ——— The use of ethyl alcohol as precipitant in the concentration of antipneumococcus serum. J. Immunol., **21**: 357–373 (1931).
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DEATHS DURING WEEK ENDED DECEMBER 27, 1941

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec. 27, 1941	Corresponding week, 1940
Data from 87 large cities of the United States:		
Total deaths	8,201	8,553
Average for 3 prior years	8,913	
Total deaths, 52 weeks	430,516	432,027
Deaths per 1,000 population, 52 weeks, annual rate	11.6	11.7
Deaths under 1 year of age	516	509
Average for 3 prior years	485	
Deaths under 1 year of age, 52 weeks	27,161	25,889
Data from industrial insurance companies:		
Policies in force	64,769,523	64,759,998
Number of death claims	9,268	9,893
Death claims per 1,000 policies in force, annual rate	7.5	8.0
Death claims per 1,000 policies, 52 weeks, annual rate	9.3	9.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JANUARY 3, 1942

Summary

Slight increases were recorded during the current week for each of the 9 important communicable diseases included in the following table, with the exception of poliomyelitis. The incidence of each of these diseases, however, with the exception of poliomyelitis, was below the 5-year (1936–40) median expectancy.

A total of 3,093 cases of influenza was reported, as compared with 2,587 for the preceding week. The 5-year median for the corresponding week is 3,993, while for the same week last year 77,820 cases were reported. Texas, with 1,319 cases, continued to report the largest number. South Carolina reported 459 cases, Virginia 273, Oklahoma 210, Alabama 134, and Arizona 104. These were the only States reporting more than 100 cases.

A total of 34 cases of tularemia was reported by 14 States. Two cases of anthrax were reported in Pennsylvania. Of 52 cases of endemic typhus fever, 21 cases occurred in Georgia and 9 each in South Carolina and Texas.

The following table shows the total numbers of cases of the 9 communicable diseases as reported weekly by telegraph during 1941. These reports cover a period of 53 weeks, from the week ended January 4, 1941, to the week ended January 3, 1942, inclusive. The median is for corresponding periods of the 5 preceding years (1936–40).

	Diphtheria	Influenza	Measles	Meningitis, meningococcus	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever	Whooping cough
1941	17,310	601,066	874,424	2,072	9,094	130,427	1,393	8,611	211,292
Median	28,586	198,982	315,390	2,884	7,331	190,991	9,648	14,328	174,646

The crude death rate for 88 large cities in the United States for the current week is 12.7 per 1,000 population, as compared with 11.5 for the preceding week and with 12.9 for the corresponding week of January 1941. The cumulative rate for the 53 weeks ended January 3, 1942, is 11.7, the same as for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended January 3, 1942, and comparison with corresponding week of 1941 and 5-year median

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1936–40	Week ended—		Median 1936–40	Week ended—		Median 1936–40	Week ended—		Median 1936–40
	Jan 3, 1942	Jan 4, 1941		Jan 3, 1942	Jan 4, 1941		Jan 3, 1942	Jan 4, 1941		Jan 3 1942	Jan 4, 1941	
NEW ENG.												
Maine	2	0	2	1	40	10	174	37	37	0	2	0
New Hampshire	0	0	0	4	----	------	18	11	5	0	0	0
Vermont	0	0	0	------	99	------	5	24	24	0	0	0
Massachusetts	9	1	5	------	----	------	166	354	354	1	3	2
Rhode Island	8	0	0	-----	----	-----	28	0	1	0	0	0
Connecticut	0	0	1	2	10	10	53	12	143	1	0	1
MID ATL.												
New York	19	15	24	[1] 7	[1] 77	[1] 44	253	1,471	294	5	3	5
New Jersey	8	9	13	13	20	20	83	582	278	3	1	1
Pennsylvania	25	16	37	------	------	------	1,010	1,457	75	1	5	2
E NO CEN												
Ohio	21	7	39	13	56	7	90	479	37	0	0	4
Indiana	1	18	21	71	236	46	13	33	11	0	0	1
Illinois [3]	34	25	48	15	34	22	50	975	45	3	0	3
Michigan [3] [4]	10	6	6	2	6		59	693	189	2	1	1
Wisconsin	0	0	2	23	64	62	0	369	359	0	0	0
W NO CEN												
Minnesota	2	0	4		2	1	151	5	21	0	0	0
Iowa	4	18	4	3	43	2	85	132	51	0	0	1
Missouri	8	8	13	5	96	96	18	29	8	1	0	1
North Dakota [3]	7	12	2	2	172	34	31	10	10	1	0	0
South Dakota	2	3	3			6	0	2	2	1	0	0
Nebraska	8	2	2		5	5	11	2	8	0	0	1
Kansas	2	3	10	9	2 453	16	137	112	101	0	0	2
SO ATL												
Delaware	2	1	2		-		7	17	6	0	0	0
Maryland [3]	8	2	4	10	16	16	166	4	11	3	1	1
Dist of Col	4	1	5		68	2	6	2	3	0	0	1
Virginia	14	13	22	273	1 752	454	121	146	67	4	1	2
West Virginia	5	8	11	10	430	64	270	61	14	1	0	0
North Carolina [4]	29	18	43	26	17	24	427	69	69	0	0	2
South Carolina [4]	12	11	11	459	1 581	909	58	33	3	0	0	1
Georgia [4]	14	5	17	58	788	133	76	8	27	0	1	0
Florida [4]	5	1	10	13	32	4	9	2	11	2	0	3
E SO CEN												
Kentucky	4	4	13		9 601	57	6	191	60	2	1	2
Tennessee [4]	7	4	12	32	613	143	228	25	51	0	2	3
Alabama [4]	12	14	14	134	1 322	377	32	75	46	1	0	3
Mississippi [3]	11	5	7							0	2	1
W SO CEN												
Arkansas	[5] 11	[5] 12	[5] 12	88	6 516	181	76	16	16	5	0	0
Louisiana [4]	8	9	12	6	3 235	23	3	2	3	2	1	1
Oklahoma	8	4	14	210	2 248	222	51	1	3	0	0	1
Texas [4]	48	32	34	1,319	33 283	453	336	50	51	6	2	1
MOUNTAIN												
Montana	0	2	3	8	893	81	41	2	8	1	0	0
Idaho	0	0	1	--	58	4	11	0	53	0	0	0
Wyoming	0	0	0	8	1 651	21	4	0	4	2	0	0
Colorado	11	3	5	47	1 066	21	401	92	43	0	0	0
New Mexico	0	0	4	--	220	8	34	55	5	0	0	1
Arizona	2	2	8	104	1 099	138	28	52	6	0	2	1
Utah [3]	1	1	0	7	2 344	7	45	13	48	0	0	0
Nevada [3]	0	-------	------	----	250	---	0	-	--- --	0	-----	- ---
PACIFIC												
Washington	0	0	1	8	1 122	-	22	18	18	0	0	0
Oregon	1	0	0	14	1 172	71	52	29	23	0	0	0
California [4]	20	16	31	99	3 030	78	813	34	43	1	3	3
Total	387	301	639	3 093	77 820	3 993	5 758	7 816	6 670	49	31	60
53 weeks	[5] 17,310	[5] 16,013	[5] 28,586	601 066	420 058	198 982	874 424	283 838	315 390	2 072	1,698	2,884

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended January 3, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1936–40	Week ended—		Median 1936–40	Week ended—		Median 1936–40	Week ended—		Median 1936–40
	Jan. 3, 1942	Jan. 4, 1941		Jan. 3, 1942	Jan. 4, 1941		Jan. 3, 1942	Jan. 4, 1941		Jan. 3, 1942	Jan. 4, 1941	
NEW ENG.												
Maine	0	0	0	22	7	11	0	0	0	1	0	0
New Hampshire	0	0	0	3	3	15	0	0	0	0	0	0
Vermont	1	0	0	12	10	5	0	0	0	0	0	0
Massachusetts	0	0	0	283	120	142	0	0	0	1	1	1
Rhode Island	1	0	0	6	4	6	0	0	0	1	0	0
Connecticut	1	1	0	30	84	51	0	0	0	0	0	0
MID. ATL.												
New York	6	2	1	332	263	361	0	0	0	4	3	4
New Jersey	3	0	0	97	144	130	0	0	0	1	0	1
Pennsylvania	2	0	0	211	258	281	0	0	0	7	10	9
E. NO. CEN.												
Ohio	2	7	2	236	264	380	0	1	6	6	1	4
Indiana	0	2	0	79	103	190	6	0	11	1	1	1
Illinois [2]	3	3	3	172	309	421	0	3	3	2	6	3
Michigan [3 4]	3	0	0	193	156	248	0	8	0	9	1	1
Wisconsin	2	0	0	145	118	181	0	5	5	2	1	1
W. NO. CEN.												
Minnesota	0	1	1	47	47	101	1	5	9	0	5	0
Iowa	0	1	0	40	45	84	1	1	16	0	1	1
Missouri	0	0	0	46	51	148	14	0	11	2	2	2
North Dakota [2]	0	0	0	11	5	28	0	1	8	0	0	0
South Dakota	0	1	0	27	14	29	0	2	5	0	0	0
Nebraska	0	0	0	20	33	38	0	1	1	0	0	0
Kansas	1	0	1	66	67	198	0	0	7	0	0	1
SO. ATL.												
Delaware	0	0	0	21	12	12	0	0	0	0	0	0
Maryland [3]	0	2	0	53	27	54	0	0	0	4	1	2
Dist. of Col.	0	0	0	11	10	11	0	0	0	1	0	0
Virginia	0	3	0	30	46	46	0	0	0	12	1	3
West Virginia	0	2	0	54	48	60	0	0	0	3	3	3
North Carolina [4]	0	0	0	70	50	56	0	0	0	1	1	1
South Carolina [4]	0	0	0	11	17	5	0	0	0	1	0	2
Georgia [4]	1	0	1	36	13	18	0	0	0	6	3	3
Florida [4]	0	3	0	0	3	9	0	0	0	4	0	1
E. SO. CEN.												
Kentucky	0	2	1	89	45	49	0	0	0	2	0	1
Tennessee [4]	2	0	0	49	37	38	0	0	0	3	1	1
Alabama [4]	0	0	0	25	47	19	0	1	0	1	2	2
Mississippi	1	0	0	26	10	13	0	0	0	0	0	2
W. SO. CEN.												
Arkansas	1	0	0	9	11	13	1	0	2	0	1	1
Louisiana [4]	3	0	0	5	5	14	0	0	0	3	12	11
Oklahoma	0	0	0	22	15	28	1	0	8	7	0	4
Texas [4]	0	1	1	48	46	73	1	0	0	3	9	11
MOUNTAIN												
Montana	1	0	0	22	26	37	0	0	4	2	0	1
Idaho	0	0	0	8	5	14	0	0	12	0	0	2
Wyoming	1	0	0	6	1	9	0	0	0	3	0	0
Colorado	0	0	0	25	30	33	0	8	6	0	1	1
New Mexico	0	0	0	5	6	10	0	0	0	0	3	3
Arizona	0	0	0	6	5	5	0	0	0	0	0	2
Utah [3]	0	0	0	26	7	19	0	0	0	0	0	0
Nevada [3]	0	-----	-----	5	-----	-----	0	-----	-----	0	-----	-----
PACIFIC												
Washington	0	2	1	67	29	39	0	0	5	0	0	1
Oregon	0	2	1	10	11	41	0	0	5	1	2	1
California [4]	3	2	2	105	78	207	0	1	5	4	4	4
Total	38	40	33	2,922	2,605	4,459	25	37	251	98	76	98
53 weeks	9,094	9,810	7,331	130,427	157,711	190,991	1,393	2,502	9,648	8,611	9,662	14,328

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended January 3, 1942, and comparison with corresponding week of 1941—Continued

Division and State	Whooping cough, week ended— Jan. 3, 1942	Whooping cough, week ended— Jan. 4, 1941
NEW ENG.		
Maine	11	50
New Hampshire	12	5
Vermont	24	15
Massachusetts	110	260
Rhode Island	31	11
Connecticut	47	71
MID. ATL.		
New York	407	375
New Jersey	148	103
Pennsylvania	167	524
E. NO. CEN.		
Ohio	116	245
Indiana	24	19
Illinois [2]	178	145
Michigan [3] [4]	461	198
Wisconsin	206	98
W. NO. CEN.		
Minnesota	21	39
Iowa	11	9
Missouri	7	17
North Dakota [2]	9	16
South Dakota	2	1
Nebraska	11	8
Kansas	85	85
SO. ATL.		
Delaware	0	14
Maryland [3]	15	59
Dist. of Col.	23	13
Virginia	44	10[illegible]
West Virginia	37	42
North Carolina [4]	110	132
South Carolina [4]	45	55
SO. ATL.—continued		
Georgia [4]	7	22
Florida [4]	10	6
E. SO. CEN.		
Kentucky	46	22
Tennessee [4]	17	17
Alabama [4]	3	18
Mississippi [3]		
W. SO. CEN.		
Arkansas	4	10
Louisiana [4]	0	4
Oklahoma	7	26
Texas [4]	64	232
MOUNTAIN		
Montana	14	13
Idaho	3	3
Wyoming	5	8
Colorado	13	23
New Mexico	9	15
Arizona	9	20
Utah [3]	47	32
Nevada [3]	0	-
PACIFIC		
Washington	78	43
Oregon	23	6
California [4]	111	154
Total	2,832	3,449
53 weeks	211,292	174,448

[1] New York City only.

[2] Rocky Mountain spotted fever, week ended Jan. 3, 1942, 2 cases, as follows: Illinois, 1; North Dakota, 1.

[3] Period ended earlier than Saturday.

[4] Typhus fever, week ended Jan. 3, 1942, 52 cases, as follows: Michigan, 2; North Carolina, 2; South Carolina, 9; Georgia, 21; Florida, 2; Tennessee, 1; Alabama, 2; Louisiana, 3; Texas, [illegible]; California, 1.

[5] Corrected report from Arkansas for the week ended Dec. 27, 1941, shows 12 cases of diphtheria, 81 cases of influenza, and 49 cases of measles, instead of the respective reports of 11, 98, and 26 cases as shown in PUBLIC HEALTH REPORTS of Jan. 2, p. 23.

WEEKLY REPORTS FROM CITIES

City reports for week ended December 20, 1941

This table lists the reports from 102 cities of more than 10 000 population distributed throughout the United States and represents a cross section of the current urban incidence of the diseases included in the table

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine											
Portland	0		0	2	4	8	0	1	0	3	29
New Hampshire											
Concord	0		0	0	0	1	0	0	0	0	10
Manchester	0		0	5	0	33	0	0	0	0	13
Nashua	0		0	0	1	2	0	0	1	7	12
Vermont											
Barre	0		0	0	0	0	0	0	0	0	----
Burlington	0		0	0	0	0	0	0	0	0	9
Rutland	0		0	0	0	0	0	0	0	0	-- ---
Massachusetts											
Boston	1		0	29	9	39	0	9	0	32	194
Fall River	3		0	3	0	41	0	0	0	1	28
Springfield	0		0	9	1	13	0	0	0	14	30
Worcester	0		0	13	4	17	0	0	0	13	50
Rhode Island											
Providence	1	1	0	7	2	3	0	2	1	48	57
Connecticut											
Bridgeport	0		0	7	1	2	0		0	3	-
Hartford	0		0	0	0	1	0		0	0	
New Haven	0		0	35	2	1	0	1	0	1	44
New York											
Buffalo	0		0	1	2	14	0	4	1	17	135
New York	20	6	5	13	76	155	0	76	1	249	1 523
Syracuse	0		0	0	1	2	0	0	0	27	45
New Jersey											
Newark	0	4	1	27	4	12	0	4	0	37	100
Pennsylvania											
Pittsburgh	2		1	2	8	22	0	3	0	15	158
Reading	0		0	2	0	2	0		0	1	21
Scranton	0			7		2	0		0	1	
Ohio											
Cincinnati	0		0	1	3	10	0	6	0	9	130
Cleveland	0	7	2	1	10	51	0	7	0	22	196
Columbus	1	2	2	2	2	5	0	0	0	11	81
Toledo	0		0	1	6	7	0	1	0	13	71
Indiana											
Fort Wayne	0		0	0	3	1	0	0	0	0	25
Indianapolis	2		0	0	10	25	0	3	0	5	101
Muncie	0		0	0	3	0	1	0	0	0	11
South Bend	0		0	0	0	2	0	0	0	0	19
Terre Haute	0		0	1	2	1	0	0	0	0	14
Illinois											
Alton	0		0	0	0	0	0	1	0	3	11
Chicago	20	5	5	8	18	89	0	27	0	102	717
Moline	0			1		0	0		0	7	13
Michigan											
Detroit	5	2	1	12	10	75	0	8	0	30	269
Flint	0		0	2	4	0	0	0	0	5	33
Grand Rapids	0		0	4	2	4	0	0	0	0	33
Wisconsin											
Madison	0			8		2	0		0	3	14
Milwaukee	0		0	1	3	42	0	2	0	115	102
Minnesota											
Duluth	0		0	0	1	8	0	1	0	0	29
St Paul	0		0	24	2	4	0	2	0	28	66
Iowa											
Cedar Rapids	0			0		1	0		1	0	
Davenport	0			0		7	0		0	0	-
Des Moines	0			1		1	0		0	0	81
Sioux City	0			0		0	0		0	0	
Waterloo	1			0		2	0		0	0	
Missouri											
Kansas City	0		4	6	2	12	0	1	0	0	108
St Louis	2	1	0	2	7	10	0	5	0	8	190
North Dakota											
Fargo	0		0	0	0	0	0	0	0	0	12
Grand Forks	0			0		0	0		0	0	----

City reports for week ended December 20, 1941

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
South Dakota											
Aberdeen	0			0		5	0		0	0	
Sioux Falls	0			0		0	0		0	0	9
Nebraska											
Lincoln	0			0		0	0		0	0	--
Omaha	0		0	1	1	4	0	1	0	0	72
Kansas											
Lawrence	0	4	0	1	1	0	0	0	0	0	3
Wichita	0	2	0	24	7	8	0		0	1	
Dist. of Col.											
Washington	0			5	11	22	0		1	16	-
Virginia											
Norfolk	1		0	0	3	1	0		0	1	37
Richmond	0		0	0	3	0	0	0	0	0	56
Roanoke	0		0	1	0	0	0	0	0	0	11
West Virginia											
Charleston	0		0	0	1	0	0	0	0	0	20
North Carolina											
Raleigh	0		0	0	0	1	0	1	0	1	9
Wilmington	0		0	30	0	0	0	0	0	4	13
South Carolina											
Florence	0		0	0	0	0	0	1	0	0	6
Georgia											
Atlanta	1	6	1	4	4	4	0		0	0	
Brunswick	0		0	0	1	0	0	1	0	0	4
Savannah	0		1	17	0	0	0	1	0	0	31
Florida											
St. Petersburg	0			1		1	0		0	0	2[illegible]
Tampa	1		0	0	1	2	0	0	1	0	2[illegible]
Kentucky											
Covington	0		0	0	3	2	0	3	0	0	2[illegible]
Louisville	0		0	4	5	29	0	4	0	31	6[illegible]
Tennessee											
Knoxville	0		0	9	0	1	0	0	0	0	3[illegible]
Memphis	0	4	2	2	2	10	0	1	0	9	7[illegible]
Alabama											
Mobile	0		2	3	2	0	0	1	0	0	[illegible]
Montgomery	0			0		0	0		0	0	
Arkansas											
Little Rock	0	8	0	0	2	1	0	0	0	0	1[illegible]
Louisiana											
Lake Charles	0			0		0	0		0	0	[illegible]
New Orleans	2	1	1	1	13	4	0	7	0	2	13[illegible]
Oklahoma											
Oklahoma City	2	3	0	0	3	2	0	1	0	0	[illegible]
Tulsa	7		0	174	6	3	0	0	0	0	2[illegible]
Texas											
Dallas	3	2	2	24	7	4	0	0	0	3	6[illegible]
Fort Worth	1		0	0	3	1	0	1	0	0	4
Houston	4		0	1	7	0	0	4	1	0	11
San Antonio	1	20	3	2	5	0	0	4	0	3	7
Montana											
Billings	0		0	0	1	2	0	0	0	0	
Helena	0		0	0	0	0	0	0	0	2	
Missoula	0		0	0	0	0	0	0	0	0	
Idaho											
Boise	0		0	0	1	0	0	1	0	0	1
Colorado											
Colorado Springs	0		0	2	0	0	0	0	0	2	1
Denver	14	26	0	29	9	1	0	2	0	16	9
Pueblo	0		0	201	4	4	0	0	0	1	1
New Mexico											
Albuquerque	0		0	0	0	0	0	1	0	0	1
Arizona											
Phoenix	0	46		5		0	0	--	0	1	-----
Utah											
Salt Lake City	0		0	3	0	3	0	1	0	2	3
Washington											
Seattle	0		0	0	3	1	0	3	2	31	9
Spokane	0		0	0	2	6	0	1	0	1	3
Tacoma	0		0	0	8	5	1	1	0	5	8

City reports for week ended December 20, 1941—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Oregon:											
Portland	0	2	0	1	5	0	0	8	0	3	77
Salem	0	--	-----	1	-----	0	0	-------	0	0	--------
California:											
Los Angeles	3	14	1	17	5	27	0	18	1	13	377
Sacramento	2	1	1	20	5	1	0	4	0	1	39
San Francisco	0	2	0	5	7	3	0	6	0	4	175

State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths	
Maine:			
Portland	0	0	1
New York:			
New York	3	0	1
New Jersey:			
Newark	1	0	0
Ohio:			
Cleveland	0	0	1
Michigan:			
Detroit	1	0	0
Iowa:			
Waterloo	0	0	1
South Dakota:			
Aberdeen	0	0	1
District of Columbia:			
Washington	1	0	0
Tennessee:			
Memphis	0	1	0
Montana:			
Helena	0	0	1
California:			
Los Angeles	0	0	1

Encephalitis, epidemic or lethargic.—Cases: New York, 2. Deaths: New York, 5.
Pellagra.—Cases: Savannah, 1; Montgomery, 1; San Antonio, 1.
Typhus fever.—Cases: New York, 1; Atlanta, 1; Savannah, 4; Montgomery, 8; New Orleans, 1; Los Angeles, 1.

Rates (annual basis) per 100,000 population for a group of 66 selected cities (population, 1940, 28,660,496)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Small pox cases	Typhoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Dec. 20, 1941	16.01	19.65	6.37	109.89	54.40	142.82	0.18	1.64	165.74
Average for week, 1936–40	22.83	270.43	11.60	247.97	101.62	171.76	2.58	3.31	160.16

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended December 6, 1941 —During the week ended December 6, 1941, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		4	-	2	7	1	2	1		17
Chickenpox		26		379	728	62	93	26	153	1 467
Diphtheria		17	8	24		5	5		1	55
Dysentery			-	8					1	9
Influenza		15			70	1	8		25	119
Measles	-	1		402	91	13	58	3	24	592
Mumps		2		461	227	41	49	28	96	904
Pneumonia		10			6	2	1		8	27
Poliomyelitis			1	1	1		1			4
Scarlet fever	1	39	5	146	265	7	29	22	27	541
Tuberculosis	4	8	10	79	41	45	6	1		194
Typhoid and paratyphoid fever		1	1	11	12		4			29
Whooping cough		9	1	153	143	2	7		18	333

GREAT BRITAIN

England and Wales—Infectious diseases—13 weeks ended June 28, 1941 —During the 13 weeks ended June 28, 1941, cases of certain infectious diseases were reported in England and Wales as follows

Disease	Cases	Disease	Cases
Diphtheria	11 650	Puerperal pyrexia	1 64
Dysentery	1 443	Scarlet fever	13 53
Ophthalmia neonatorum	1 045	Typhoid and paratyphoid fever	92
Pneumonia	12 800		

England and Wales—Vital statistics Second quarter 1941 —The following vital statistics for the second quarter of 1941 for England and Wales are taken from the Quarterly Return of Births, Deaths, and Marriages, issued by the Registrar-General and are provisional

	Number	Annual rate per 1 000 population		Number	Annual rate per 1 000 population
Live births	147 246	14 2	Deaths under 1 year of age	8 712	[1] 59
Stillbirths	5 474	0 53	Deaths from diarrhea (under 2 years of age)	665	[1] 4 5
Deaths all causes	139 891	13 5			

[1] Per 1 000 live births

NOTE —All deaths are of civilians only

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above mentioned diseases, except yellow fever, during the current year All reports of yellow fever are published currently

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month

Smallpox

Morocco—Casablanca.—An epidemic of smallpox was reported to have broken out in the region of Casablanca, Morocco, during the last 2 weeks of December, according to information dated December 31, 1941. Official figures are not available, but known cases among the natives were stated to be occurring at the rate of about 100 a week, and 47 cases had occurred in Europeans. The report stated that the population was being vaccinated.

Typhus Fever

Morocco—Casablanca.—Information dated December 31, 1941, reports both typhus fever and typhoid fever present in Casablanca, Morocco, in epidemic form.

Yellow Fever

Brazil Amazonas State—Porto Velho—On October 1, 1941, 1 death from yellow fever was reported in Porto Velho, Amazonas State, Brazil.

Colombia—Intendencia of Meta—San Martin.—On November 26, 1941, 1 death from yellow fever was reported in San Martin, Intendencia of Meta, Colombia.

Dahomey—Grand Popo.—On December 15, 1941, 2 suspected cases of yellow fever were reported in Grand Popo, Dahomey.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E R COFFEY, *Assistant Surgeon General, Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world, (2) articles relating to the cause, prevention, and control of disease, (3) other pertinent information regarding sanitation and the conservation of the public health

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DISTRIBUTION OF HEALTH SERVICES IN THE STRUCTURE OF STATE GOVERNMENT*

CHAPTER III. TUBERCULOSIS CONTROL BY STATE AGENCIES

By JOSEPH W. MOUNTIN, *Assistant Surgeon General*, and EVELYN FLOOK, *United States Public Health Service*

This article is the third of a series* dealing with services rendered by official State agencies in relation to a number of separate problems currently recognized as having public health significance. The purpose and general plan of the study upon which these articles are based were described in the initial chapter. By way of review, it might be said briefly that during the year 1940 the United States Public Health Service conducted a survey of some thirty-five separate categories of health activity which may be carried on by any department, board, or commission of State government. The purpose of the study was to bring up to date, as of 1940, the second edition of Public Health Bulletin No. 184[1]—a survey of health organization in 1930. For the current edition, an effort was made to obtain a complete, over-all picture of health service furnished at the State level by tracing each category of service through every agency rendering any part thereof. The survey was not designed to cover the sum total of services received by the public, but rather to show what the various central State organizations contribute to those services in terms of regulatory functions, financial grants-in-aid, or direct service programs. In other words, all functions financed through funds expended by State agencies are included, irrespective of whether such funds were derived from State

*From the States Relations Division This is the third chapter of the third edition of Public Health Bulletin No 184 Previous chapters are

Mountin, Joseph W, and Flook, Evelyn Distribution of health services in the structure of State government Chapter I The composite pattern of State health services. Public Health Rep, 56 1673 (August 22, 1941)

Mountin, Joseph W., and Flook, Evelyn Distribution of health services in the structure of State government Chapter II Communicable disease control by State agencies Public Health Rep, 56 2233 (November 21, 1941)

Succeeding chapters will be published in subsequent issues of the PUBLIC HEALTH REPORTS

[1] Ferrell, John A, Smillie, Wilson G, Covington, Platt W, and Meade, Pauline A, International Division of the Rockefeller Foundation for the Conference of State and Provincial Health Authorities of North America Health Departments of States and Provinces of the United States and Canada. Public Health Bulletin No. 184 (Revised). United States Government Printing Office, Washington, 1932.

legislative appropriations, from Federal grants, or from local contributions of the State department, board, or commission officially responsible for the respective health programs. The services performed by local agencies are not encompassed by the findings herein reported.

Tuberculosis control, like venereal disease control, was excluded from the preceding chapter which dealt with the general communicable diseases since the tuberculosis program, because of its magnitude and the special techniques involved, seemed to justify separate discussion.

AGENCIES THAT PARTICIPATE IN TUBERCULOSIS CONTROL

It was pointed out in the second article of this sequence [2] that the health department has major responsibility for reducing the incidence of general communicable disease. Even when other agencies of State government participate, their functions are apt to be of a subordinate nature. In contradistinction to this situation, State responsibility for tuberculosis control is characterized by dispersion rather than by concentration. The marked divergence of authority in the total State scheme for tuberculosis control results primarily from the importance of hospitalization as a factor in the complete program. Indeed, it is not uncommon for hospitalization of the tuberculous to be regarded as an entity completely separate and apart from the case-finding and other field activities incident to the problem. This situation stems from the evolution of the program. It began as a sanatorium movement under individual boards and commissions, while mass case-finding and field-control measures developed later under the auspices of public health agencies. In many places this separation has continued, often with little or no coordination.

While it is true that without exception the health department functions in some capacity for the control of tuberculosis when all ramifications of the situation are considered, in only one-fourth of the jurisdictions is it the sole official body involved. Furthermore, in States having multiple-agency programs, the extent of health department activity does not necessarily supersede that of other agencies. There is little uniformity in the manner in which responsibility is divided among the organizations concerned. In one State, activities of the several agencies may be rather evenly distributed; in the next, primary control is centered in one agency and contributions of the others are rather incidental to the main program. Moreover, activities of the several agencies may be closely correlated within one State; within another they are completely unrelated.

The purpose of this report is not to show the total amount of tuberculosis service either available to or received by inhabitants of the several States. Rather, it is proposed to feature the part played by

[2] See text footnote*.

the State in the total scheme designed specifically for human tuberculosis control. Activities of voluntary and local health agencies are not under discussion. Neither is any attempt made to evaluate the methods employed by any of the agencies involved.

It is recognized, of course, that a number of general measures such as broad health education procedures, nutritional programs, and steps

TABLE 1.—*Official State agencies participating in the tuberculosis programs of each State and Territory, the District of Columbia, and the Virgin Islands**

State or Territory	Department of State government								
	Health	Welfare, social security, or public assistance	Tuberculosis board or commission	Board of control, department of institutions, eleemosynary board, etc.	Education	Independent State hospital or laboratory	State legislature	State university or college	Other
Alabama	x								
Arizona	x	x				x			
Arkansas	x		x						
California	x								
Colorado	x	x							
Connecticut	x		x				x		
Delaware	x								
District of Columbia	x								x
Florida	x	x	x		x				x
Georgia	x								
Idaho [a]	x								
Illinois	x								
Indiana	x	x			x			x	
Iowa	x			x				x	
Kansas	x	x							
Kentucky	x						x		
Louisiana	x	x	x			x			
Maine [a]	x			x					
Maryland	x		x				x		
Massachusetts	x	x							
Michigan	x		x						
Minnesota	x	x							
Mississippi	x								
Missouri	x			x					
Montana	x			x					
Nebraska	x			x					
Nevada	x								
New Hampshire	x	x	x						
New Jersey	x			x					
New Mexico	x	x							
New York	x								
North Carolina	x		x						
North Dakota	x			x					x
Ohio	x	x							
Oklahoma	x			x					
Oregon	x			x				x	
Pennsylvania	x								
Rhode Island	x						x		
South Carolina	x								
South Dakota	x			x				x	
Tennessee	x				x				
Texas	x			x					
Utah	x								
Vermont	x	x							
Virginia	x				x				
Washington	x								x
West Virginia	x	x		x			x		
Wisconsin	x							x	x
Wyoming	x			x					
Alaska	x	x							
Hawaii	x					x			
Puerto Rico	x								x
Virgin Islands	x								x

*Eradication of tuberculosis among animals is not covered by this report.

[a] The department of health is really a division (Idaho) and bureau (Maine) of public health, subordinate to the department of welfare (Idaho) and the department of health and welfare (Maine).

for the prevention of silicosis all contribute to the general tuberculosis program. These, and additional pertinent activities, are given appropriate treatment in other articles of this series. For instance, eradication of tuberculosis among animals is covered under "milk control." It may be stated here, however, that all States—usually through the department of agriculture or a special livestock sanitary commission—carry out some plan for control of animal tuberculosis. Such activities have an important bearing upon human tuberculosis. Another related program is the one administered by most State departments of education for general rehabilitation of the physically handicapped. Arrested cases of tuberculosis, along with other disabled groups, are offered opportunities for vocational training under this set-up.

Table 1 is presented to acquaint the reader with the various official departments, boards, and commissions which contribute to the over-all tuberculosis service of each State and Territory, the District of Columbia, and the Virgin Islands. In addition to identifying the participating agencies for each individual State,[3] this tabulation emphasizes the relative frequency with which the various organizations operate throughout the country.

CONTENT OF STATE TUBERCULOSIS PROGRAMS

As explained in the initial report,[4] the functions of a State agency in relation to particular elements of the health program may be classified according to certain categories of service. In other words, each agency participating in any health activity utilizes one or a combination of the following approaches to the problem: "It promulgates rules and regulations; it is a law enforcing body; it furnishes promotional, supervisory, and/or consultative service to local units; it conducts educational programs; it distributes and/or administers financial grants-in-aid to local units; it renders direct service through staff members of State central and district offices." As may be expected, the several classes of service are not given equal weight in respect to each problem. For instance, in general communicable disease control the exercising of regulatory authority, promotion of immunization, and distribution of immunizing materials are predominant features of the total program. In tuberculosis control, on the other hand, paramount interest centers in operation of direct service programs. Conducting special case-finding surveys and maintaining diagnostic clinics, sanatoria, and pneumothorax stations overshadow other functions. Like-

[3] The term "State" as used in the discussion which follows includes the States, the Territories, the District of Columbia, and the Virgin Islands

[4] See text footnote[4].

wise, financial subsidy of local facilities is a more prominent measure in the eradication of tuberculosis than in many other public health performances.

Table 2 shows the frequency with which each particular phase of the State's tuberculosis program is charged to the several participating agencies. Items are listed in conformance with the standard method adopted for showing the presence or absence of State services of different categories. However, in discussion, the several functions of the various agencies will not always be treated separately nor necessarily follow the order in which they are presented in the table. Inasmuch as it is desirable to highlight certain services which are particularly significant to the problem of tuberculosis control, some items will be accorded detailed treatment while others less important may be grouped and disposed of with a few general remarks. Explanation of the code system used to identify the various governmental units concerned is found at the end of the table. The classification "Other departments of State government" covers the following agencies or offices: Hotel commission, board of vocational and adult education, office of the State treasurer, office of the Governor, and board of commissioners. They are grouped under the one heading, either because of the relative infrequency with which they operate for the control of tuberculosis or because of the minor character of their participation

From data presented in table 2, it is apparent that certain regulatory functions are always delegated to the State health department. Untabulated material indicates that the reporting of tuberculosis is the specific item which is universally covered by this entry. Other laws, rules, and regulations, enforcement of which falls within this classification, pertain to restrictive measures to be observed by tuberculous patients, to conditions of employment for those having tuberculosis, and to provision for the hospitalization of various types of cases. The regulatory function of 33, 23, and 26 State health departments covers the several activities in the order mentioned. In 7 States the primary responsibility for enforcement is local, but the State agency is vested with such power in the event of failure of local authorities. Employment restrictions are usually confined to food and milk handlers and school employees—teachers, janitors, etc. In 1 State the department of education and the hotel commission, respectively, are charged with regulation of employment of these particular groups. The regulatory responsibility of all other agencies is related to determination and application of admission policies for hospitalization at State expense. In addition, 3 health departments, 4 tuberculosis commissions, 5 departments of welfare, and 7 boards of control require the patient's county or town of residence to share the cost of care in State sanatoria.

TABLE 2.—*Department of State government * responsible for specific activities designed to control tuberculosis in each State and Territory, the District of Columbia, and the Virgin Islands*

Activity	State or Territory							
	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia
Promulgates and/or enforces State laws, rules, and regulations	1	1, 2	1, 3	1	1, 2	1, 3	1	1, 9
Promotes local programs of control	1	1	1	1	1	3	[b] 1	------
Conducts educational programs								
For the general public	1	1	1	1	[c] 1	[a] 3	------	1
For physicians	1	------	------	------	------	------	------	------
Supervises and/or provides consultation service to local organizations	1	1	1	1	1	3	[b] 1	------
Distributes and/or administers grants-in-aid								
Subsidizes local tuberculosis clinics	[a] 1	[b] 1	[a] 1	[a] 1	[a] 1	------	------	------
Subsidizes local home nursing service for tuberculosis	------	------	------	[a] 1	[a] 1	------	------	------
Furnishes State-aid to local tuberculosis hospitals	1	------	------	1	2	7	------	------
Furnishes money or equipment to voluntary agencies for tuberculosis control work	------	------	------	------	------	------	------	1
Operates a service program								
Operates diagnostic clinics—								
Mobile	1	1	1	1	------	------	------	------
Stationary	1	------	1	------	------	3	[b] 1	1
Supplies diagnosticians to assist with local clinics	------	------	------	------	1	3	------	------
Does tuberculin testing of school groups	------	1	------	------	[c] 1	------	[b] 1	------
Furnishes tuberculin free of charge—								
To local health units or voluntary agencies	1	1	------	------	[a] 1	[a] 3	------	[a] 1
To private physicians	1	1	------	------	------	------	------	------
Provides nursing service for promotion of clinic attendance and follow-up work	------	1	------	------	------	3	[b] 1	1
Operates pneumothorax centers for nonsanatorium patients	1	------	------	------	2	3	[b] 1	1
Makes special studies to determine the incidence of tuberculosis in selected population groups	1	1	------	1	------	1	[b] 1	1
Provides free laboratory service for diagnosis	1	6	1	1	1	1	1	1
Operates tuberculosis hospitals	------	2	3	------	------	3	1	1
Supervises subsidized local tuberculosis hospitals	1	------	------	1	2	3	------	------
Renders additional service not covered in this classification	------	------	1	------	1	------	------	1

See footnotes at end of table.

Table 2.—*Department of State government * responsible for specific activities designed to control tuberculosis in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Florida	Georgia	Idaho [a]	Illinois	Indiana	Iowa	Kansas	Kentucky
Promulgates and/or enforces State laws, rules, and regulations	1, 3, 5, 9	1	1	1	1, 2	1, 4	1, 2	1
Promotes local programs of control	1	1	1	------	1	1	1	1
Conducts educational programs:								
For the general public	1, 2, 5	1	[e] 1	------	1, 5	1	1	1
For physicians	1	1	------	------	1, 8	1, 8	------	1
Supervises and/or provides consultation service to local organizations	1	1	1	[d] 1	1	1	1	1
Distributes and/or administers grants-in-aid								
Subsidizes local tuberculosis clinics	1	[c] 1	[c] 1	[c] 1	------	------	[c] 1	------
Subsidizes local home nursing service for tuberculosis	------	[b] 1	[e] 1	------	[c] 1	------	------	[a] 1
Furnishes State-aid to local tuberculosis hospitals	------	------	1	------	------	------	------	7
Furnishes money or equipment to voluntary agencies for tuberculosis control work	------	------	------	------	------	------	------	------
Operates a service program								
Operates diagnostic clinics—								
Mobile	1	1	------	------	------	1	------	1
Stationary	------	1	------	------	[b] 2	------	------	------
Supplies diagnosticians to assist with local clinics	------	------	1	[c] 1	------	------	1	------
Does tuberculin testing of school groups	1	[c] 1	------	[c] 1	[e] 1	------	1	------
Furnishes tuberculin free of charge—								
To local health units or voluntary agencies	1	[c] 1	1	[c] 1	------	1	1	1
To private physicians	1	------	------	------	------	1	1	------
Provides nursing service for promotion of clinic attendance and follow-up work	[e] 1	------	------	------	------	1	1	------
Operates pneumothorax centers for nonsanatorium patients	1	------	------	------	------	------	------	------
Makes special studies to determine the incidence of tuberculosis in selected population groups	1, 2	1	------	1	1	1	------	------
Provides free laboratory service for diagnosis	1	1	1	1	1	1, 8	1	1
Operates tuberculosis hospitals	3	1	------	------	2	4	2	1
Supervises subsidized local tuberculosis hospitals	------	------	------	------	------	------	------	------
Renders additional service not covered in this classification	------	------	1	------	------	1	------	------

See footnotes at end of table.

TABLE 2.—*Department of State government * responsible for specific activities designed to control tuberculosis in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Louisiana	Maine [a]	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri
Promulgates and/or enforces State laws, rules, and regulations	1, 2, 3, 6	1, 4	1, 3	1, 2	1, 3	1, 2	1	1, 4
Promotes local programs of control	1	1	1, 3	1	1	1, 2	1	1
Conducts educational programs								
For the general public	1	1	1	1	1	[e]1	1	1
For physicians	1	------	------	------	1	1	1	------
Supervises and/or provides consultation service to local organizations	1	1	1	1	1	1, 2	1	1
Distributes and/or administers grants in aid								
Subsidizes local tuberculosis clinics	------	------	1	------	------	------	------	[e]1
Subsidizes local home nursing service for tuberculosis	[e]1	------	------	------	------	------	[e]1	------
Furnishes State-aid to local tuberculosis hospitals	------	4	7	1	3	2	------	4
Furnishes money or equipment to voluntary agencies for tuberculosis control work	------	------	7	------	------	------	------	------
Operates a service program								
Operates diagnostic clinics—								
Mobile	1	1	------	1	------	------	1	[f]1
Stationary	6	------	------	1	------	[b]2	1	[b]4
Supplies diagnosticians to assist with local clinics	------	------	[b]3	1	------	------	1	------
Does tuberculin testing of school groups	------	1	------	[e]1	------	------	------	[f]1
Furnishes tuberculin free of charge—								
To local health units or voluntary agencies	1	1	------	1	1	1	------	1
To private physicians	------	1	------	1	1	1	------	[e]1
Provides nursing service for promotion of clinic attendance and follow-up work	------	1	[e]1	[e]1	------	[e]1	------	1
Operates pneumothorax centers for nonsanatorium patients	2, [b]6	[b]4	3	[b]1	[b]3	[b]2	------	------
Makes special studies to determine the incidence of tuberculosis in selected population groups	1	1	1	1	1	1, 2	1	------
Provides free laboratory service for diagnosis	1	1	1	1	1	1	1	1
Operates tuberculosis hospitals	3, [g]6	4	3	1, [g]2	3	2	1	4
Supervises subsidized local tuberculosis hospitals	------	------	------	1	1, 3	2	------	4
Renders additional service not covered in this classification	2	1	3	------	1	1, 2	1	------

See footnotes at end of table

Table 2.—*Department of State government * responsible for specific activities designed to control tuberculosis in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina
Promulgates and/or enforces State laws, rules, and regulations	1, 4	1, 4	1	1, 3	1, 4	1, 2	1	1, 3
Promotes local programs of control	[c] 1	1	1	-	4	1	1	[b] 3
Conducts educational programs—								
For the general public	[e] 1	1	1	-	-	1	1	[b] 3
For physicians	-	-	-	-	-	-	[b] 1	[b] 3
Supervises and/or provides consultation service to local organizations	[d] 1	[d] 1	1	-	[d] 4	1	1	[b] 3
Distributes and/or administers grants-in-aid								
Subsidizes local tuberculosis clinics	-	-	-	-	-	[e] 1	[e] 1	-
Subsidizes local home nursing service for tuberculosis	[e] 1	-	-	-	-	[e] 1	[e] 1	[e] 1
Furnishes State-aid to local tuberculosis hospitals	-	-	-	2	4	-	1	-
Furnishes money or equipment to voluntary agencies for tuberculosis control work	-	-	-	1	-	1	-	-
Operates a service program								
Operates diagnostic clinics—								
Mobile	-	-	-	-	[b] 4	-	[b] 1	[b] 3
Stationary	-	[b] 4	-	-	[b] 4	-	[b] 1	[b] 3
Supplies diagnosticians to assist with local clinics	-	-	-	-	-	-	-	-
Does tuberculin testing of school groups	[e] 1	-	1	-	-	-	-	[b, e] 3
Furnishes tuberculin free of charge—								
To local units or voluntary agencies	-	[c] 1	-	-	-	-	1	3
To private physicians	-	[c] 1	-	-	-	-	1	3
Provides nursing service for promotion of clinic attendance and follow up work	-	[e] 1	1	-	[c] 1	-	-	-
Operates pneumothorax centers for nonsanatorium patients	-	-	-	-	4	-	[b] 1	[b] 3
Makes special studies to determine the incidence of tuberculosis in selected population groups	1	1	1	-	-	-	1	[b] 3
Provides free laboratory service for diagnosis	1	1	1	1	1	1	1	1
Operates tuberculosis hospitals	4	4	-	3	4	2	1	3
Supervises subsidized local tuberculosis hospitals	-	-	-	2	4	-	1	-
Renders additional service not covered in this classification	1	-	-	-	-	-	1	3

See footnotes at end of table.

TABLE 2.—*Department of State government* responsible for specific activities designed to control tuberculosis in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	North Dakota	Ohio	Okla-homa	Ore-gon	Penn-sylva-nia	Rhode Island	South Caro-lina	South Dakota
Promulgates and/or enforces State laws, rules and regulations	1, 4	1, 2	1, 4	1, 4, 8	1	1	1	1, 4
Promotes local programs of control	1	1	1	1	------	1	[b] 1	1
Conducts educational programs								
For the general public	1	1	1	------	1	1	[b, e] 1	1
For physicians	------	------	------	------	------	------	[b] 1	1
Supervises and/or provides consultation service to local organizations	[d] 1	[d] 1	1	1	------	1	[b] 1	1
Distributes and/or administers grants-in-aid								
Subsidizes local tuberculosis clinics	------	------	------	------	------	------	[e] 1	------
Subsidizes local home nursing service for tuberculosis	------	[e] 1	[e] 1	------	------	------	[e] 1	[e] 1
Furnishes State-aid to local tuberculosis hospitals	------	------	------	------	------	7	------	------
Furnishes money or equipment to voluntary agencies for tuberculosis control work	------	------	------	------	------	------	------	------
Operates a service program								
Operates diagnostic clinics—								
Mobile	------	------	1	------	------	[b] 1	1	------
Stationary	------	------	1	------	1	[b] 1	[b] 1	------
Supplies diagnosticians to assist with local clinics	1	1	------	------	------	------	------	------
Does tuberculin testing of school groups	------	[e] 1	------	------	[e] 1	[e] 1	------	[e] 1
Furnishes tuberculin free of charge								
To local health units or voluntary agencies	1	------	1	[e] 1	1	------	[e] 1	1
To private physicians	1	------	1	[e] 1	------	------	[e] 1	[e] 1
Provides nursing service for promotion of clinic attendance and follow-up work	1	------	------	------	1	1	------	------
Operates pneumothorax centers for nonsanatorium patients	------	[f] 2	------	[b, c] 4	1	[b] 1	[b] 1	------
Makes special studies to determine the incidence of tuberculosis in selected population groups	1	------	------	------	1	1	------	------
Provides free laboratory service for diagnosis	1	1	1	1	1	1	1	1, 8
Operates tuberculosis hospitals	4	2	4	4, 8	1	1	1	4
Supervises subsidized local tuberculosis hospitals	------	------	------	------	------	------	------	------
Renders additional services not covered in this classification	4, 9	------	------	------	1	------	------	------

See footnotes at end of table.

Table 2.—*Department of State government* responsible for specific activities designed to control tuberculosis in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin
Promulgates and/or enforces State laws, rules, and regulations	1	1, 4	1	1, 2	1	1	1, 2, 4	1
Promotes local programs of control	1	1	1	1	1, 5	1	1	1
Conducts educational programs								
For the general public	1, 5	1	1	1	1, 5	1	1	1
For physicians	1	1	-----	-----	1	1	-----	-----
Supervises and/or provides consultation service to local organizations	1	1	1	1	1	1	1	1
Distributes and/or administers grants-in-aid								
Subsidizes local tuberculosis clinics	-----	-----	-----	-----	-----	1	-----	-----
Subsidizes local home nursing service for tuberculosis	•1	•1	•1	-----	-----	•1	-----	-----
Furnishes State-aid to local tuberculosis hospitals	1	-----	-----	2	1	9	2, 7	1
Furnishes money or equipment to voluntary agencies for tuberculosis control work	-----	-----	-----	-----	-----	-----	7	-----
Operates a service program								
Operates diagnostic clinics—								
Mobile	1	1	b1	-----	1	-----	-----	-----
Stationary	1	-----	-----	1	-----	-----	-----	-----
Supplies diagnosticians to assist with local clinics	-----	-----	-----	-----	-----	1	-----	-----
Does tuberculin testing of school groups	•1	-----	-----	1	1	-----	-----	•1
Furnishes tuberculin free of charge—								
To local health units or voluntary agencies	•1	1	•1	-----	1	-----	•1	1
To private physicians	-----	-----	-----	1	-----	-----	-----	•1
Provides nursing service for promotion of clinic attendance and follow-up work	•1	-----	-----	1	•1	-----	-----	1
Operates pneumothorax centers for nonsanatorium patients	-----	-----	b1	b2	1	-----	-----	-----
Makes special studies to determine the incidence of tuberculosis in selected population groups	1	1	1	1	1	1	-----	1
Provides free laboratory service for diagnosis	1	1	1	1	1	•	1	1, 8
Operates tuberculosis hospitals	-----	4	1	2	1	-----	4	• 1
Supervises subsidized local tuberculosis hospitals	1	-----	-----	-----	1	1	-----	1
Renders additional service not covered in this classification	1	-----	-----	1, 2	1	1	2	1, 8, 9

See footnotes at end of table.

TABLE 2.—*Department of State government* responsible for specific activities designed to control tuberculosis in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory				
	Wyoming	Alaska	Hawaii	Puerto Rico	Virgin Islands
Promulgates and/or enforces State laws, rules, and regulations	1, 4	1, 2	1	1, 9	1, 9
Promotes local programs of control	1	1	1	1	-------
Conducts educational programs					
For the general public	1	1	1	1	1
For physicians	-------	-------	1	-------	-------
Supervises and/or provides consultation service to local organizations	1	1	1	1	-------
Distributes and/or administers grants-in-aid					
Subsidizes local tuberculosis clinics	-----	-------	-------	-------	-------
Subsidizes local home nursing service for tuberculosis	------	-------	-------	-------	-------
Furnishes State-aid to local tuberculosis hospitals	------	2	1	------	------
Furnishes money or equipment to voluntary agencies for tuberculosis control work	-------	-------	-------	-------	-------
Operates a service program					
Operates diagnostic clinics—					
Mobile	-------	1	-------	-------	-------
Stationary	------	-------	1	1	1
Supplies diagnosticians to assist with local clinics	-------	-------	-------	-------	-------
Does tuberculin testing of school groups	[c] 1	1	1	-------	-------
Furnishes tuberculin free of charge—					
To local health units or voluntary agencies	------	-------	1	1	-------
To private physicians	[c] 1	1	1	-------	-------
Provides nursing service for promotion of clinic attendance and follow-up work	[c] 1	1	1	1	-------
Operates pneumothorax centers for nonsanatorium patients	-------	-------	-------	1	1
Makes special studies to determine the incidence of tuberculosis in selected population groups	------	1	1	1	-------
Provides free laboratory service for diagnosis	1	1	1	1	1
Operates tuberculosis hospitals	4	-------	-------	1	[g] 1
Supervises subsidized local tuberculosis hospitals	-------	-------	1	-------	-------
Renders additional service not covered in this classification	-------	-------	-------	-------	-------

*Code
1 Health department
2 Department of welfare, social security, or public assistance
3 State tuberculosis board or commission, or single board of trustees, directors, or managers responsible for more than one State sanatorium
4 State board of control, department of institutions, department of institutions and agencies, State board of examiners, State board of affairs, or board of charities and corrections
5 Department of education
6 Independent State hospital (*separate* board of trustees, directors, or managers responsible for each State sanatorium), or independent State laboratory
7 State legislature
8 State university or college
9 Other departments of State government

[a] The department of health is really a division (Idaho), and bureau (Maine) of public health, subordinate to the department of public welfare (Idaho) and the department of health and welfare (Maine)
[b] Service rendered by staff of the State sanatorium which is administered by the indicated State agency.
[c] To a limited extent—selected areas or groups only, or upon request only.
[d] Consultation service only
[e] As part of grant-in aid to local health units for general health work.
[f] Not routinely, but as demonstrations for educational purposes
[g] No special tuberculosis hospital, but general hospitals which have facilities for care and treatment of tuberculous patients

Promotional, supervisory, and advisory activities carried on at the State level represent, for the most part, health department functions. Departments of institutions and tuberculosis commissions carry on promotional programs independently of the health department in 1 and 2 States, respectively, but in all other States where promotional, supervisory, or advisory work is done by agencies other than the health department there is split responsibility for this portion of the complete plan. In 4 States no official agency engages in promotional, supervisory, or advisory measures.

Arrangement of educational programs for the general public (including school groups) represents an important activity of State health departments. In only 2 States is the tuberculosis commission entirely responsible for educational projects. When departments of education and welfare are engaged in educational work, the health department also participates. Only about one-third of the States conduct educational programs for physicians pertaining to the diagnosis and treatment of tuberculosis, but where such steps have been undertaken the health department is generally the State agency accountable.

Instead of maintaining direct service units of their own, some States choose to discharge their entire obligations for tuberculosis control by contributing financial aid to local communities for operation of facilities maintained at that level. In other jurisdictions, subsidy of local endeavors represents a supplement to service provided directly by the State agency. Four types of financial aid are granted by State departments of government to local jurisdictions. Local diagnostic clinics and home nursing services as such are subsidized directly by the health department only; this practice is followed in but 7 States. More generally, it is the policy of the State agency to finance these two items of local service through a grant-in-aid to local health units for general health work rather than for tuberculosis activities as a separate entity; about two-fifths of the States follow this procedure. Considerable variation exists, of course, in the extent to which local clinics and nursing services are subsidized within each of the States indicated. In some instances subsidy is quite limited in scope, being restricted to selected areas, while in others the policy is followed on a State-wide basis.

Provision of hospital facilities represents the chief purpose for which State agencies extend financial aid to political subdivisions or to individual institutions. There is more scattered responsibility for distribution of financial aid when support of local tuberculosis hospitals is the objective than when State funds are allotted to local field services. In all, nearly half of the States make some provision for financially aiding local tuberculosis hospitals. The health department is charged with disbursing this fund more frequently than any other State agency. Administration of the subsidy by the department of welfare is practiced by 6 jurisdictions. Another arrangement which prevails in 5 States is the making of direct grants to hospitals by the State legislature. Of the 24 States which subsidize local tuberculosis hospitals, 16 also maintain State sanatoria. The other 8 utilize local hospitals exclusively for providing hospital service partly or wholly at State expense.

Health departments, departments of welfare, or tuberculosis commissions responsible for distribution of the subsidy usually specify

that the cooperating hospitals must meet certain requirements set up by the State agency. Supervision of varying intensity is maintained. In some places, State control extends to close observation of all administrative policies and practices, approval of treatment methods, and selection of personnel of the financially aided local sanatoria; in others, it is limited to superficial periodic inspection of the physical plant or its operation. Grants made directly to local hospitals by State legislatures are practically always unconditional. Two outstanding methods obtain for the payment of subsidy; according to one plan, a flat annual sum is allotted by the State agency to selected local institutions; according to the other, the basis of contract is an agreement by the State organization to pay a certain sum per day or week for each needy patient hospitalized.

Several States operate partly through their respective State tuberculosis associations, which are voluntary organizations established to render various types of service in the field of tuberculosis control. The legislative bodies of 2 States and the health departments of 2 others give financial aid to these voluntary agencies for extension of their programs. In still another State, the health department provides the State tuberculosis association with X-ray equipment for furtherance of its case-finding work. It should be stated also that in some instances voluntary agencies contribute either money or service to the official State program. Actually, this is the more usual relationship between the official and nonofficial State agencies engaged in tuberculosis control activities. Detailed discussion of this arrangement is not included here, however, inasmuch as the present study is limited to a description of the functions of official State agencies only.

Direct service programs operated by the States for control of tuberculosis include a wide range of activities. Those most often engaged in are listed in table 2. From this tabulation one may also derive an understanding of the particular activities usually delegated to the health department, as contrasted with those less uniformly administered. Laboratory diagnosis is the only type of direct service furnished without exception by all States. The health department is the outstanding agency in affording this service.

Provision of diagnostic service through clinics maintained as stationary units or through itinerant staffs which reach a number of points within the State at varying intervals is an arrangement upon which the States are about evenly divided. Eleven of them operate fixed clinics exclusively, while in 10 only the traveling units are found. Mobile X-ray equipment is utilized for clinics of the latter classification. In 14 States both types of clinics are maintained. Service offered in connection with these chest clinics covers any combination of the following: Tuberculin testing, completion of a case history, physical examination, and X-ray examination. No diagnostic clinic

service is provided by official State agencies in the remaining jurisdictions. Greater variation exists in the agency responsible for maintenance of stationary clinics than of mobile units. Clinics of State agencies other than the health department are practically always operated in conjunction with the sanatoria which the parent organizations administer. A few health departments, likewise, follow a similar procedure. About half of the States supply direct nursing service for arrangement of clinics, promotion of attendance, and follow-up work. Furnishing tuberculosis nurses is preponderantly a health department function.

Other case-finding projects engaged in by State agencies include routine tuberculin testing of school children. However, this service is regarded as a State function in only about half of the jurisdictions under consideration. Groups which have been made the focus of special case-finding studies in one or more States are migratory laborers, mill and factory workers, contacts of reported cases and deaths, college and normal school students, inmates and employees of State institutions, and school teachers, janitors, and bus drivers. The same diagnostic methods are not employed by all States, but the most common procedure is skin testing, followed by X-ray of positive reactors. In a number of areas this procedure is being supplanted by direct X-ray examination with 35-millimeter film as a more practicable device for mass surveys. Fluoroscopy without the use of film is utilized occasionally for examination of contacts.

Probably the most striking example of divergence of authority for tuberculosis control can be found in the administration of the State sanatoria. Of the 42 States which maintain their own tuberculosis hospitals, 14 charge their health department with this function and 13 delegate the authority to a board of control, board of institutions, eleemosynary board, board of charities and corrections, or similar agency. In 8 States a tuberculosis board or commission operates the sanatorium portion of the program, while the department of welfare is responsible in 7 areas.

It will be recalled that patients hospitalized in State sanatoria operated by health departments are more apt to be accepted fully at State expense than are those entering sanatoria administered by other State agencies. A higher proportion of official bodies other than the health department require the patient or his county or town of residence to participate in defraying the cost of care. Further study of admission policies of the different State sanatoria brings to light some interesting variations. The patient as a general rule is expected to pay such portion of a fixed weekly or monthly charge as he is able, and the State, or State and county combined, bear the remainder of the expense. In 12 States, theoretically, indigent patients only are accepted. Notwithstanding, this restriction does not appear to be

rigidly followed in practice. Furthermore, even if it were, the number of persons affected would be difficult to determine because of the fact that tuberculosis patients very early fall in need of public assistance. Finally, a few States make no economic restriction—all patients are hospitalized entirely at State expense. Residential requirements range from "no restriction" to five years within a particular county of a State. The most common requirement is "State residence—length unspecified." Most States impose no restrictions for admission to hospitalization on the basis of type or stage of the disease beyond stipulating that the case must be recommended by a practicing physician or local health officer. In a few States, however, only cases showing likelihood of recovery are accepted and several others hospitalize incipient cases only.

Eight of the 10 States which do not maintain their own sanatoria give financial aid to local hospitals upon their agreement to accept medically indigent patients. In other words, all but 2 States offer, at State expense, at least some measure of hospital care for the tuberculous.

Consideration of the bed capacity of tuberculosis hospitals is not included in the present report for two reasons. First, as has been pointed out repeatedly, State facilities only are covered herein, and a count of available tuberculosis beds gives only a partial picture when restricted to those maintained under the auspices of State agencies. Second, this subject has been treated exhaustively by the American Medical Association[5] and the National Tuberculosis Association,[6] as well as by one of the authors (Mountin) and others in an earlier study.[7]

One of the more recent developments in the field of tuberculosis control is the operation of pneumothorax centers for nonsanatorium cases. Efficacy of this type of therapy has been demonstrated through its use in practically all modern sanatoria. However, State provision of the service for ambulatory patients is less extensively practiced. True, sanatoria of about half the jurisdictions have out-patient departments which make pneumothorax refills available to all discharged patients who wish to return at regular intervals to receive such treatment. Nevertheless, a relatively small proportion of patients apply for the service when thus offered, since only those who live within a comparatively short distance find it possible to return to the sanatorium as frequently as is necessary. Recognizing this, a few States have pioneered in the establishment of centers at numerous accessible points where ambulatory patients may receive treatment.

[5] Tuberculosis facilities in the United States J Am Med Assoc, 114 765 (March 2, 1940)

[6] Tuberculosis Hospital and Sanatorium Directory National Tuberculosis Association, New York, 1938

[7] Mountin, Joseph W, Pennell, Elliott H, and Pearson, Kay Regional differences in hospital facilities for tuberculosis, from the standpoints of accommodations, sources of financial support, and operating costs. Transactions of the Thirty-fifth Annual Meeting of the National Tuberculosis Association, 1939

This service is designed for one of two purposes, either to reduce the period of disability or to lessen the likelihood of the patient's spreading his infection. The State agency functions in one of several ways in supplying this service: It periodically details staff members of the State sanatorium to stations established at local hospitals; it trains private physicians in pneumothorax technique with the proviso that they administer the treatment in local hospitals or their own offices at a nominal cost to the patient; or it trains private physicians, then pays them on a case-by-case basis for the services rendered the medically indigent. In one State approximately fifty stations have been established where needy cases are given pneumothorax refills at State expense.

Some mention should be made, perhaps, of a few activities covered by the category "Additional service not included in the above classification." Rendering consultation service to private physicians and voluntary tuberculosis organizations and interpreting X-ray films submitted by them are types of service offered by 8 health departments and 1 tuberculosis commission. Maintenance of a register of tuberculosis deaths, active cases, suspected cases, contacts, and cases discharged from sanatoria is a feature of nearly as many State programs. Another project reported by health departments fairly often is the conduct of special demonstrations in case-finding technique. Activities peculiar to 1 or 2 States each are: The provision for periodic follow-up examinations of discharged sanatorium patients, operation or subsidization of preventoriums for care of tuberculous children, engagement in special research projects in tuberculosis control, inspection and approval of all tuberculosis hospitals, irrespective of whether they receive subsidy, and inclusion of rehabilitation services exclusively for arrested cases of tuberculosis. These latter services are apart from the general vocational rehabilitation programs which are operated for various types of physically handicapped persons.

EXPENDITURES FOR TUBERCULOSIS CONTROL

Although this discussion deals with the presence or absence of specific activities for tuberculosis control rather than with the volume or adequacy of any particular service, the relative emphasis placed by the various States upon their tuberculosis programs is regarded as especially pertinent. It is impossible, of course, to determine the total cost of State services for tuberculosis, because in practically all areas some tuberculosis service is rendered under other designations. For instance, amounts charged to public health nursing, general communicable disease control, public health education, and laboratory services are all likely to cover some tuberculosis activities, volume and cost of which are immeasurable. Indeed, 19 States list no expenditure for regulatory, promotional, educational, and field diagnos-

tic services because no division within the responsible State agency is assigned exclusively to tuberculosis control. This does not mean, however, that these States make no provision for the aforementioned services; instead, in most of these 19 States the administrative and field activities are operated as part of the general communicable disease control measures, health education programs, public health nursing duties, or as one feature of sanatorium service. Actually, even the States which report earmarked funds for tuberculosis control spend additional amounts which are included under other nomenclature.

In spite of the limitations described, expenditures based on funds designated specifically for tuberculosis, when related to the extent of the problem in the several States, probably still represent the most satisfactory criterion for comparing the extent of effort of the several States toward controlling tuberculosis. This measure is susceptible to certain types of analysis which are believed to reflect true differences among the States, providing the fact is not obscured that in all States the figures reported are index rather than absolute amounts, and that they are recognized as representing minimum rather than maximum expenditures. The number of deaths from tuberculosis was chosen as an index to the extent of the problem in each State.

Approximate annual expenditures by official State agencies for tuberculosis services labeled as such range from less than $2,000 to over $2,000,000, with the figure for the entire country reaching nearly 25 million dollars. All funds disbursed by State agencies for designated tuberculosis activities are included, regardless of the source of such funds. State appropriations constitute the major item in the expenditure picture, of course, although they are supplemented by local contributions and Federal grants, which jointly constitute about 10 percent of the total. From the standpoint of field services alone, about one-fourth of the total amount expended is derived from Federal grants, whereas approximately 10 percent of the cost of hospitalizing tuberculous patients in State sanatoria is borne by local taxing bodies. When reduced to terms of expenditure per tuberculosis death, the range among the States extends from less than $1.00 to over $2,000, with $371 as the average and $412 as the median. (See table 3.) Sixteen States spend less than $200 per tuberculosis death for tuberculosis service listed as such; 10 spend between $200 and $500; 13, from $500 to $1,000; and 12, more than $1,000. Total jurisdictions studied, it will be recalled, include the 48 States, the District of Columbia, 3 Territories, and the Virgin Islands. However, 2 jurisdictions were unable to segregate funds expended for tuberculosis service from moneys allotted to other health activities.

TABLE 3—*Approximate total annual expenditures * and expenditures per tuberculosis death by all official State agencies for tuberculosis control activities designated as such in each State and Territory, the District of Columbia and the Virgin Islands*

State or Territory	Approximate total annual expenditure * for tuberculosis activities designated as such	Total deaths from tuberculosis in 1939	Approximate annual expenditure per tuberculosis death for tuberculosis activities designated as such
Total	$24 906 300	67 144	$371
Alabama	122 100	1 546	79
Arizona	73 500	892	82
Arkansas	648 200	994	652
California	751 300	3 909	192
Colorado	64 900	665	98
Connecticut	1 [illegible]41 500	5[illegible]9	2 573
Delaware	197 600	1[illegible]	1 275
District of Columbia	664 400	419	1 586
Florida	332 100	922	360
Georgia	213 400	1 514	141
Idaho	24 600	99	248
Illinois	1 600	3 630	(a)
Indiana	178 200	1 413	126
Iowa	294 100	486	605
Kansas	319 300	418	764
Kentucky	150 600	1 996	75
Louisiana	140 400	1 384	101
Maine	485 500	281	1,728
Maryland	723 700	1 291	561
Massachusetts	1 995 100	1 649	1 210
Michigan	2 724 600	1 906	1 429
Minnesota	762 700	809	943
Mississippi	198 200	1 080	184
Missouri	659 100	1 768	373
Montana	182 000	248	734
Nebraska	90 200	219	412
Nevada	(b)	59	(b)
New Hampshire	156 700	139	1 127
New Jersey	1,281 400	1 99[illegible]	643
New Mexico	52 100	428	122
New York	1 701 800	6 482	263
North Carolina	459 400	1 804	255
North Dakota	227 700	142	1 604
Ohio	122 800	2 [illegible]	42
Oklahoma	295 200	1 076	274
Oregon	334 600	323	1 036
Pennsylvania	1 429 800	4 23[illegible]	335
Rhode Island	402 000	2[illegible]	1,737
South Carolina	252 000	850	296
South Dakota	182 900	190	963
Tennessee	81 400	2 326	35
Texas	546 200	3 911	140
Utah	[c] 78 200	95	823
Vermont	122 900	137	897
Virginia	798 300	1 617	494
Washington	401 500	709	566
West Virginia	610 300	882	693
Wisconsin	958 100	863	1,111
Wyoming	37 100		675
Alaska	8 700	299	29
Hawaii	409 000	2[illegible]	1 693
Puerto Rico	306 000	4 73[illegible]	65
Virgin Islands	(b)	20	(b)

* Expenditures for the services considered represent index rather than absolute amount and include only expenditures allocated specifically to tuberculosis activities as such. Because of variations in fiscal practices, figures cover the most recent year for which information was available at the date of interview. In some instances estimates or appropriation figures were accepted in the absence of precise expenditure records. All funds disbursed by State agencies for designated tuberculosis activities are included regardless of the source of such funds. State appropriations are supplemented by local contributions and Federal grants, which jointly constitute about 10 percent of the total.

a Less than $1.00.

b No record of expenditures for tuberculosis as a separate activity.

c New program just getting under way. Expenditure reported represents only a fraction of a complete year.

Some explanation was sought for the wide variance in relative expenditures for State tuberculosis services. The first factor to be considered was the financial ability of the State to support service. Are expenditures for State tuberculosis work in 16 States limited to less than $200 per tuberculosis death because these States can afford to pay no more, and are the 12 States spending more than $1,000 doing so because they rank high in the economic scale? Investigation was made of the influence of State wealth, as expressed by per capita income payments to individuals,[8] upon expenditures for State tuberculosis services. After States were arrayed in descending order of per capita income payments and divided into quarters, the expenditure per tuberculosis death was determined for the State occupying the median position of each quarter. Figure 1 portrays the result of this investigation and suggests that in general a State's purchasing power has a distinct bearing upon the amount expended for tuberculosis

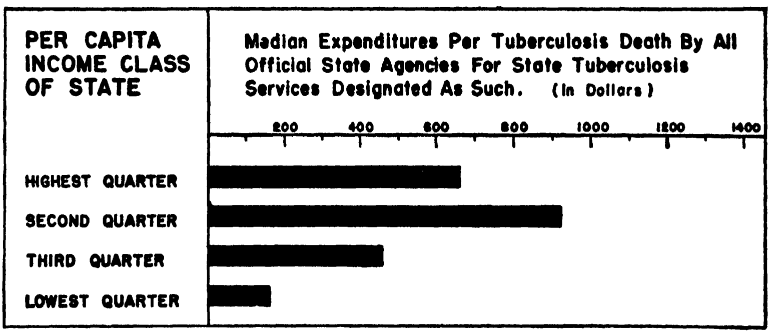

FIGURE 1 —Median expenditures per tuberculosis death by all official State agencies for tuberculosis services designated as such in States of different per capita income classes

control, since the wealthier half of the States spend decidedly more for this purpose than do the poorer 50 percent.

Direct increase in expenditures as the wealth level rises is not always indicated, however, as some States of the top income group spend less than do those which rank next highest. With these exceptions, progression in expenditure accords with increase in wealth. Of particular interest is the extremely small amount expended by States of the lowest income bracket.

Location within a particular geographic area was the second State characteristic studied for any effect it might possibly have upon expenditures for State tuberculosis services as related to the problem in each jurisdiction. Four broad geographic areas (Northeastern, Southern, Central, and Western) previously established for analysis

[8] Martin, John L, National Income Division, Department of Commerce Income Payments to Individuals by States, 1929-39 Survey of Current Business, October 1940.

of public health data [9] were used as a basis for analyzing the influence of a State's location upon its expenditure for control of tuberculosis. "The area described as Northeastern embraces all States from Maine to Ohio and the Virginias. Beginning with Virginia and West Virginia, the Southern region stretches across the lower half of the country through Texas and Oklahoma, including, in the main, Gulf States and the tier adjacent to them. The Central area, in turn, is composed of the upper portion of the country which lies west of the Ohio River and east of the Rocky Mountains. Both mountain and Pacific States constitute the fourth section, the Western." Figure 2

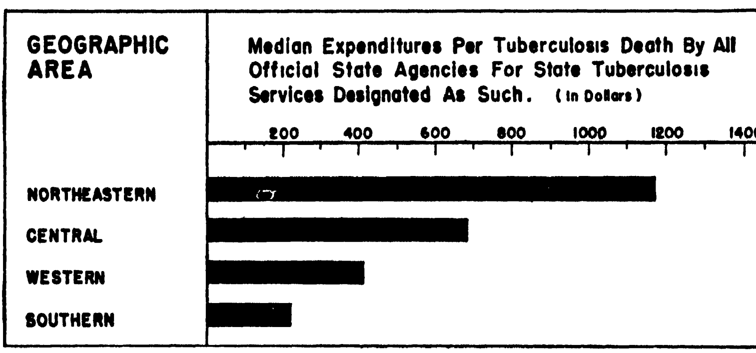

FIGURE 2.—Median expenditures per tuberculosis death by all official State agencies for tuberculosis services designated as such in States of different geographic areas.

reveals marked differences among the several geographic areas in the amounts recorded as expenditures for State tuberculosis services. That these differences might be emphasized, the normal order of presenting the several geographic sections has been abandoned in favor of arrangement by gradual diminution in expenditures. The figure representing the median expenditure of States of the Northeastern region is more than five times as high as the corresponding figure for those of the Southern area. States of the Central and Western sections occupy positions between the Northeastern and Southern extremes, those in the central part of the country making

[9] Mountin, Joseph W., Pennell, Elliott H., and Pearson, Kay. The distribution of hospitals and their financial support in southern States. Southern Medical Journal, Vol. 33, No. 4, April 1940.

The established geographic areas with the States contained therein are as follows:

Northeastern: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia.

Southern: Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas.

Central: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas.

Western: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, and California.

appreciably higher expenditures than those in the western. These differences, in the main, are likely to represent the economic position of the several geographic groups rather than their concern for tuberculosis. Seven States of the Northeastern area also rank among the wealthiest quarter, while 10 of the Southern States are found in the lowest income level.

By way of brief summary, it might be stated that certain State characteristics, namely, wealth and geographic position, contribute quite noticeably to variation among the States in their expenditures for tuberculosis services. It is recognized, of course, that there is some measure of relationship between the two factors.

DISTRIBUTION OF EXPENDITURES ACCORDING TO TYPE OF SERVICE

As might be expected, a very high proportion of the total expenditure reported for tuberculosis work is charged to hospitalization with relatively little—less than 5 percent for the country as a whole—to field activities. Table 4 shows, however, that the same situation does not obtain for all jurisdictions. Whereas 19 States make no report of separate funds expended for field services, this feature of the program accounts for more than 20 percent of the total bill in 5 other States. One circumstance which undoubtedly determines, to a small extent at least, the diverse distribution of expenditures according to purpose is the fact that no record is available of the portion of expenditures for general health work which might be charged to tuberculosis field service. Table 4 further reveals that when all States are considered, more than twice as much money is expended for maintenance and operation of State-owned tuberculosis hospitals as for State aid to local sanatoria.

Considerable variation exists among the States in this splitting of total hospital expenses between the maintenance and operation of State sanatoria and the subsidy of local sanatoria. It will be recalled that 2 jurisdictions make no provision for hospitalization of the tuberculous, 1 has no special tuberculosis hospital but operates general hospitals which have facilities for care and treatment of tuberculous patients, 26 utilize State sanatoria exclusively, 8 have no State hospital facilities, but rely upon subsidy of local institutions to meet the State's responsibility in this matter, while both methods are employed by the remaining 16 States. The differences among these latter 16 States present a most interesting study. In 12 of them maintenance and operation of State sanatoria represents the major expenditure item and accounts for anywhere from slightly more than half to nearly all of the cost of the two types of hospital service. In the other 4, the situation is reversed, State subsidy of local sanatoria outweighing the sums expended for the State tuberculosis hospitals.

TABLE 4.—*Approximate total annual expenditures * by all official State agencies for tuberculosis activities designated as such and percentage distribution of those expenditures according to type of service rendered in each State and Territory, the District of Columbia, and the Virgin Islands*

State or Territory	Approximate total annual expenditure* for tuberculosis activities designated as such	Percent of approximate total annual expenditure* allocated to specified type of service		
		Field control	Maintenance and operation of State sanatoria	State subsidy of local sanatoria
Total	$24 906 300	4 1	68 4	27 5
Alabama	122 100	38 6		61 4
Arizona	73 500	9 4	90 6	
Arkansas	648 200	1 8	98 2	
California	751 300	2 6		97 4
Colorado	64 900	23 0		77 0
Connecticut	1 541 500	2 8	94 6	2 6
Delaware	197 600	(a)	100 0	
District of Columbia	664 400	5 6	94 4	
Florida	332 100	5 6	94 4	
Georgia	213 400	16 6	83 4	
Idaho	24 600	11 8		88 2
Illinois	1 600	100 0		
Indiana	178 200	(a)	100 0	
Iowa	294, 100	10 5	89 5	
Kansas	319 300	2 8	97 2	
Kentucky	150 000	3 1	75 7	21 2
Louisiana	140 400	13 4	86 6	
Maine	485 500	(a)	88 9	11 1
Maryland	723 700	20 0	69 5	10 5
Massachusetts	1 995 100	5 7	70 1	24 2
Michigan	2 724 000	0 1	17 3	82 6
Minnesota	762 700	1 9	41 0	57 1
Mississippi	198 200	5 3	94 7	
Missouri	659 100	(a)	87 8	12 2
Montana	182 000	(a)	100 0	
Nebraska	90 200	14 0	86 0	
Nevada	(a)	(a)	-	
New Hampshire	156 700	(a)	54 8	45 2
New Jersey	1 281 400	1 2	35 3	63 5
New Mexico	52 100	(a)	100 0	
New York	1 701 800	3 9	96 1	(a)
North Carolina	459 400	(b)	100 0	
North Dakota	227 700	(a)	100 0	
Ohio	122 800	(a)	100 0	
Oklahoma	295 200	3 0	97 0	
Oregon	334 600	(a)	100 0	
Pennsylvania	1 420 800	5 4	94 6	
Rhode Island	462 000	(a)	96 8	3 2
South Carolina	252 000	(a)	100 0	
South Dakota	182 900	(a)	100 0	
Tennessee	81 400	87 7		c 12 3
Texas	540 200	3 0	97 0	
Utah	78 200	(a)	100 0	
Vermont	122 900	6 4	93 6	(b)
Virginia	798 300	9 4	84 3	6 3
Washington	401 500	0 4		99 6
West Virginia	610 900	1 6	94 5	3 9
Wisconsin	978 400	(a)	27 5	72 5
Wyoming	37 100	(a)	100 0	
Alaska	8 700	100 0		(a)
Hawaii	409 000	4 1		95 9
Puerto Rico	306 000	9 4	90 6	
Virgin Islands	(a)	(a)	(d)	

* Expenditures for the services considered represent index rather than absolute amounts and include only expenditures allocated specifically to tuberculosis activities as such. Because of variations in fiscal practices, figures cover the most recent year for which information was available at the date of interview. In some instances estimates or appropriation figures were accepted in the absence of precise expenditure records. All funds disbursed by State agencies for designated tuberculosis activities are included regardless of the source of such funds. State appropriations constitute the major item, but about one-fourth of the amount expended for field services is derived from Federal grants, whereas approximately 10 percent of the cost of hospitalizing tuberculous patients in State sanatoria is borne by local taxing bodies.

a No record of expenditures for tuberculosis as a separate activity.

b Included in the figure reported for State sanatoria.

c New program just getting under way. Expenditure reported represents only a fraction of a complete year.

d No special tuberculosis hospital, but general hospitals which have facilities for care and treatment of tuberculous patients.

State programs for all three types of service, field control, maintenance of State sanatoria, and State subsidy of local sanatoria, are probably more strongly influenced by complementary programs at the local level than by any single factor. Yet, as stated previously, consideration of the actual extent of locally provided services is not

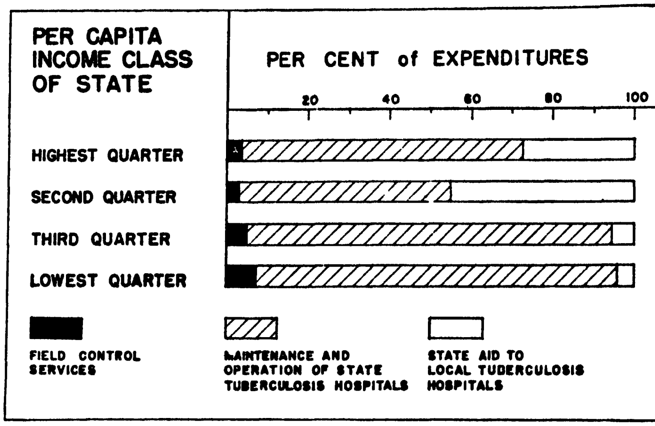

FIGURE 3.—Percentage of total expenditures for State tuberculosis services designated as such which are allotted to the indicated type of activities in States of different per capita income classes.

encompassed by the present study. Other determinants of the type of service receiving most emphasis are a State's wealth and its location. Figures 3 and 4 picture the effect of these characteristics.

From the data presented in figure 3 it is obvious that States lowest in the gradations of wealth devote a considerably higher portion of their total expenditures to field control activities than do those of the upper limits. Obviously, an inverse proportion is allotted to hospital service in the several groups of States. At the same time, there appears to be direct association between State wealth and the method of

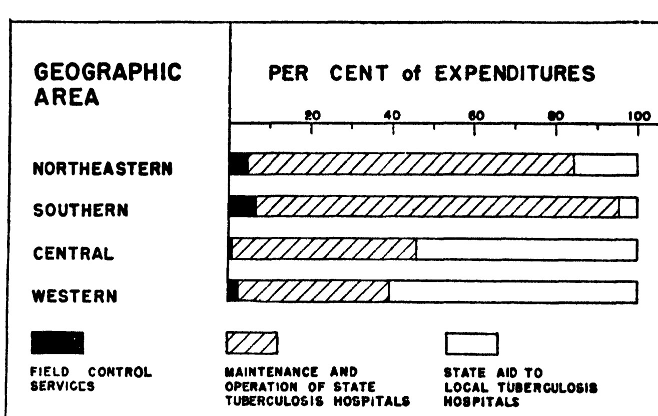

FIGURE 4.—Percentage of total expenditures for State tuberculosis services designated as such which are allotted to the indicated type of activities in States of different geographic areas.

arranging for hospitalization. State subsidy of local tuberculosis hospitals is a more important feature of the tuberculosis program of States in the upper half of the per capita income scale than in those of the lower.

According to figure 4, when States are grouped by major geographic divisions, it becomes apparent that those of the southern portion of the country designate relatively more of their aggregate tuberculosis expenditures for field work than do States of any other geographic section. Insofar as the means of providing hospitalization is concerned, State subsidy of local sanatoria is a much more common practice in the Central and Western areas than in the remainder of the country. It should be noted, however, that even though a relatively small fraction of the total is expended for this purpose in the Northeastern region as a whole, more individual States of that area than of any other utilize this arrangement in small measure.

DISCUSSION

In commenting upon the findings of a survey of tuberculosis services provided by official State agencies, it must be emphasized, first, that tuberculosis programs carried on at the State level differ widely in policy and content. State programs may include any one or any combination of the following functions: Regulatory authority, promotional and educational activity, advisory and supervisory assistance to local units, financial subsidy of local tuberculosis work, or provision of direct State service. Furthermore, extreme variation characterizes the type of direct service provided. Dissimilarity is noted in methods and policies for: Operating diagnostic clinics; furnishing diagnosticians to assist with local clinics; arranging for tuberculin testing of school children or merely distributing the testing material; providing facilities for pneumothorax treatment of nonsanatorium patients; and finally, maintaining State sanatoria or utilizing local sanatoria which are subsidized by the State. The extent and intensity of service provided at the State level may possibly be determined largely by the type of complementary local service available.

Probably the most striking single disclosure of the entire study is the multiplicity of official State agencies which participate in the various tuberculosis programs under consideration. The Nation-wide, over-all picture of activities for tuberculosis control, as carried on by official agencies of the State, includes the contribution of some dozen-odd agencies. In many instances the variety of agencies represents little more than a difference in terminology.[4] In others, however, there is sharp distinction with respect to scheme of organization and method of operation. In about half of the States two agencies parti-

cipate in tuberculosis activites; single-agency and triple-agency programs are found in 13 and 9 States, respectively; and occasionally there are State programs administered by four or even five governmental units. The difficulties encountered in planning a unified and balanced program under such circumstances are not hard to imagine. Little uniformity is found in division of labor among the multiple participating departments. In reality, efforts of the several official organizations working within a single State are often completely unrelated. Lack of coordination between the hospital program and field activities when delegated to two separate agencies is an outstanding example of this situation. Even within the hospital program alone there is divided control in certain States. In States which both operate State sanatoria and financially aid those under local control it is not unusual to find one department operating the State sanatoria while another administers the financial aid allotted to local hospitals.

Complete expenditure figures for State tuberculosis services are difficult if not impossible to determine because of the interrelationship of other activities. The approximate expenditures on services designated for tuberculosis total nearly 25 million dollars, and average somewhat less than $400 per tuberculosis death for the Nation as a whole. These expenditures bear a direct relationship to the buying power and geographic position of the individual States.

Poorer States allot a larger proportion of their total expenditures to field service than do the wealthy ones, probably because they find it difficult to finance hospitalization with any degree of adequacy, this being the most expensive item in the complete tuberculosis program. There are also geographic differences in both the content and the intensity of the tuberculosis programs but it so happens that geographic groupings of States partially coincide with groupings based on economic consideration.

In brief, for one reason or another, not only the organization and operation of State programs for tuberculosis control but also the financial support thereof is characterized by extreme diversity of pattern.

THE PIGMENT OF THE MALARIA PARASITE[1]

By Dempsie B. Morrison and William A. D. Anderson

As the malaria parasite develops within an intact erythrocyte, the hemoglobin diminishes and a granular pigment appears which is red-brown by transmitted light and gray-black by reflected light. In an extensive literature dealing with this pigment (cf., review by Sinton and Ghosh (*1*)), it has been characterized variously as melanin, hematin, a hematin complex, and a hematin derivative.

[1] From the Departments of Chemistry and Pathology, University of Tennessee College of Medicine, Memphis Received for publication July 23, 1941.

Carbone (*2*), Ascoli (*3*), and Brown (*4*) prepared extracts of malaria pigment from tissues and identified the pigment, spectroscopically, as hematin. However, the extracts were admittedly crude and the methods of extraction did not preclude the possibility that hematin had been liberated from some preexisting complex. Sinton and Ghosh (*1*) appear to have been the first to isolate malaria parasites in quantity in pure state. From *Plasmodium knowlesi*, obtained from the blood of heavily infected monkeys, they prepared relatively large quantities of pigment presumably in unaltered form. Extensive chemical and physical tests, which included spectrophotometric analyses, identified the pigment as free hematin.

Fairley and Bromfield (*5*) have described a brown extracorpuscular and extraparasite pigment in the plasma of a patient with blackwater fever, for which they suggest the name "pseudomethemoglobin", since spectroscopic tests demonstrated its similarity to but not identity with methemoglobin. Further study of the pigment suggested that it was a compound of hematin and plasma albumin, and Fairley (*6*) renamed the compound "methemalbumin."

In consideration of such diverse opinion we have undertaken to reinvestigate the problem of the chemical identity of the malaria pigment, preliminary to a study [2] of its possible role in the malaria syndrome. Our observations support the opinion of Sinton and Ghosh that the pigment as it exists in the plasmodium of malaria is free hematin.[3]

METHODS AND PROCEDURE

The source of parasite material was blood from monkeys (*Macacus rhesus*) infected with *Plasmodium knowlesi* (Rockefeller strain). In some cases the terminal infection was as high as 75 percent of total erythrocytes. The animals were bled under nembutal anesthesia by cannulation of the femoral artery, or by syringe directly from the heart when the animal had collapsed and died or was dying. Dry potassium oxalate was used as anticoagulant, and analyses were made as soon as possible after blood was obtained.

Blood samples were centrifuged in graduated tubes, plasma removed, and distilled water added to lake the cells and release the parasites. The parasites swell but do not disintegrate in distilled water. The parasite mass was washed repeatedly on the centrifuge with distilled water until hemoglobin or other soluble pigment could no longer be detected by the spectroscope in the wash water.

The presence in the parasites of a pigment containing iron protoporphyrin was demonstrated by preparing hemin crystals and reduced pyridine hemochromogen directly from portions of the parasite mass.

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[2] In press.

[3] Hereafter hematin will be called ferriheme acid, as proposed by Morrison and Williams (*7*).

Evidence that the pigment exists in the parasite as preformed ferrihemic acid (hematin) is furnished by dissolving the pigment from the parasite mass with 0.5 N sodium carbonate solution and demonstrating the identity of its spectrophotometric curve with that of a solution of recrystallized hemin in 0.5 N sodium carbonate. We have confirmed the observation by Sinton and Ghosh *(1)* that 0.5 sodium carbonate does not denature or otherwise alter hemoglobin within the time required for solution by this solvent of pigment from the parasite.

All pigment analyses were made with the Bausch and Lomb universal spectrophotometer, with an assembly of cups which permitted readings with the following depths of solution: 1, 2.5, 5, 10, 20, 50, and 100 mm. Thus, any portion of the spectral regions covered, 500 to 700 mμ, could be examined under optimal conditions.

RESULTS AND CONCLUSIONS

In figure 1, curves 1 and 2 represent spectrophotometric analyses of 0.5 N sodium carbonate solutions of parasite pigment and recrystallized hemin, respectively. The curves are identical except for concentration differences.

Of the spectrophotometric curves in figure 2, curve 2 is for an acid-acetone solution of pigment from hemoglobin-free parasites, and curve 1 represents an acid-acetone solution of ferrihemic acid prepared from parasite-free hemoglobin of the same blood. Again the two curves are identical except for differences in concentrations. Curve 3 of this figure describes an acid-acetone extract of the spleen of an infected monkey. This represents approximately 17.5 times the quantity of ferrihemic acid which can be obtained from the hemoglobin present in the spleen of a normal monkey.

SUMMARY

Malaria parasites (*Plasmodium knowlesi*) contain a pigment which yields hemin crystals and reduced pyridine hemochromogen. When the pigment is extracted from the parasites under conditions which do not affect the spectral characteristics of hemoglobin, it is identifiable spectrophotometrically as ferrihemic acid (hematin).

ACKNOWLEDGMENT

The study and observations on which this paper is based were aided by a grant from the Tennessee Valley Authority through the Department of Preventive Medicine of the University of Tennessee.

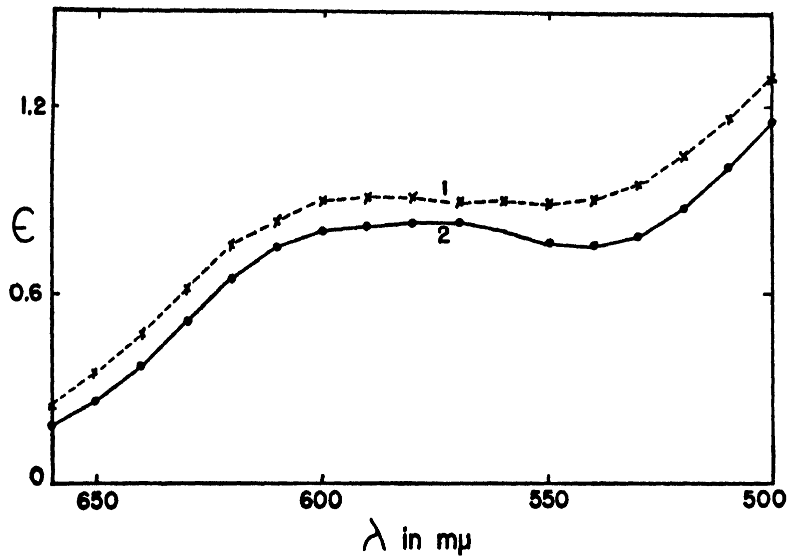

FIGURE 1 —Spectrophotometric curves, 1 cm cup, of hemoglobin-free parasite pigment (curve 1) and recrystallized hemin in the same solvent (curve 2), in 0 5 N Na_2CO_3

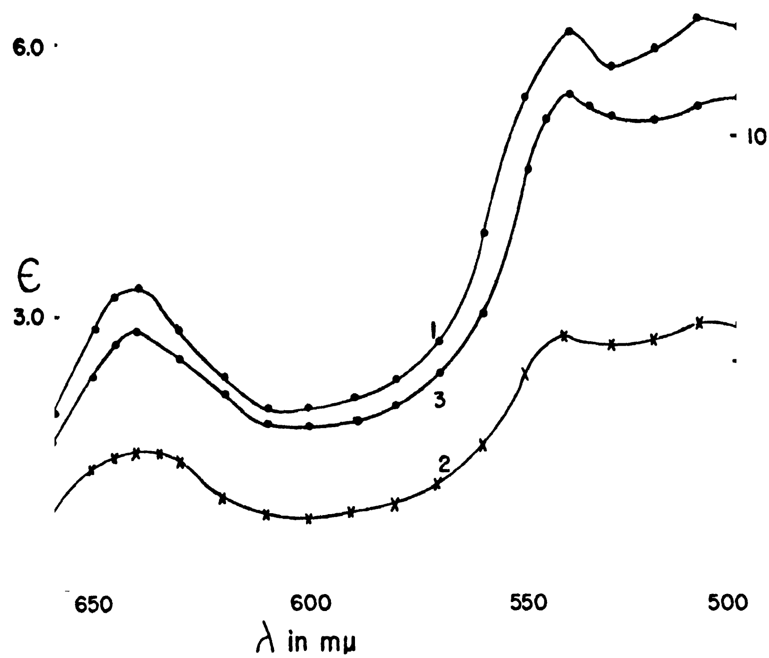

FIGURE 2 —Spectrophotometric curves of ferrihemic acid in acid acetone, 1 cm cup Curve 1, the total ferrihemic acid from 100 ml of parasitized blood in 100 ml acid acetone Curve 2, the parasite pigment from the same volume of blood in 100 ml acid acetone Curve 3, the pigment from a 15 gm parasitized spleen in 100 ml of acid acetone Read curves 1 and 2 against scale to the left and curve 3 against scale to the right.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

November 30 December 27, 1941

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the PUBLIC HEALTH REPORTS under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended December 27, 1941, the number reported for the corresponding period in 1940, and the median number for the years 1936–40.

DISEASES ABOVE MEDIAN PREVALENCE

Influenza.—There were 11,034 cases of influenza reported for the 4 weeks ended December 27. Of the total number, Texas reported 5,242, South Carolina, 1,409, Virginia, 898, Arizona, 520, Arkansas, 462, and Oklahoma, 408 cases; more than 80 percent of the cases occurred in those 6 States. The incidence was only about one-tenth that reported for this period in 1940, but it was about one and one-half times the 1936–40 median figure for the corresponding period.

During the last 4 weeks of 1940 an epidemic of influenza was in progress, starting in the Mountain and Pacific regions and spreading into the Central and South Atlantic regions and later into the North Atlantic regions, reaching its peak during the week ended January 18, 1941, with a total of approximately 120,000 cases. For the past several weeks the current high incidence has been confined almost entirely to the States above mentioned, and in all regions except the South Atlantic and West South Central the incidence was below the average seasonal incidence.

Poliomyelitis.—The incidence of poliomyelitis remained unusually high in the New England, Middle Atlantic, East North Central, and East South Central regions. For the country as a whole the number of cases (251) was slightly lower than the figure for 1940, but it was about 25 percent above the average incidence for preceding years. Since the recent outbreak of poliomyelitis, which started in July in the East South Central region, did not reach the North Atlantic

regions until September, the decline would naturally come later there; but the current incidence in both North Atlantic regions was the highest recorded for this period since 1935, when there was a more severe epidemic in those regions. The West South Central, Mountain, and Pacific regions were unaffected by the recent rise of this disease and the incidence in those regions was slightly below normal for this period

Number of reported cases of 9 communicable diseases in the United States during the 4-week period November 30–December 27, 1941, the number for the corresponding period in 1940, and the median number of cases reported for the corresponding period, 1936–40

Division	Current period	1940	5-year median	Current period	1940	5-year median	Current period	1940	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	1 830	1 369	2 551	11 034	128 111	7 985	17 320	23 776	18 196
New England	34	17	40	12	50	26	1 919	1 435	1 435
Middle Atlantic	137	173	329	82	115	113	3 699	9 735	3 429
East North Central	260	205	459	310	1 854	494	1 259	7 626	1,836
West North Central	94	82	184	157	2 309	316	1 427	1 409	1 409
South Atlantic	516	321	633	2 638	3 981	2 607	3 133	922	962
East South Central	212	146	269	485	2 318	1 415	603	858	324
West South Central	425	304	401	6 124	33 612	2 940	1 463	535	385
Mountain	75	46	80	808	30 401	851	1 384	733	812
Pacific	77	75	140	418	51 471	466	2 433	523	523
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	143	115	158	251	260	201	11 821	11 519	15 128
New England	19	9	9	25	1	1	1 250	858	858
Middle Atlantic	33	14	40	54	12	9	2 387	2 525	3 385
East North Central	16	16	20	32	110	23	3 [illegible]	3 [illegible]	[illegible] 524
West North Central	13	11	11	17	33	23	1 323	1 352	2 067
South Atlantic	21	31	2	24	39	22	1 [illegible]	1 148	1 168
East South Central	14	18	30	51	12	18	773	730	656
West South Central	13	15	1	20	14	21	[illegible]	362	725
Mountain	3	0	8	5	9	7	402	332	551
Pacific	6	11	11	19	24	24	650	490	1 103
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	70	220	636	414	426	497	13 465	15 631	[3] 15 238
New England	0	0	0	23	16	18	1 326	1 582	1 582
Middle Atlantic	0	0	0	63	74	74	3 801	4 4[illegible]	4 125
East North Central	18	79	[illegible]	65	45	68	3 987	3 510	3 510
West North Central	24	10	29	14	26	3[illegible]	541	1 203	46[illegible]
South Atlantic	1	1	4	104	87	90	1 126	1 974	1 590
East South Central	[illegible]	0	[illegible]	31	48	39	401	58	381
West South Central	16	13	32	67	84	115	456	531	388
Mountain	2	9	111	13	26	33	[illegible]	333	393
Pacific	3	11	64	34	20	34	1 141	1 126	647

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded.
[3] Three-year (1938–40) median.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The number of cases (1,830) of diphtheria reported for the 4 weeks ended December 27 was about 35 percent above the

incidence recorded for the corresponding period in 1940, but it was only about 72 percent of the 1936–40 median incidence for this period. Increases over last year were reported from the North Central, South Atlantic, and East South Central regions, but the West South Central region alone reported an excess over the normal seasonal incidence.

Measles.—The number of cases of measles rose from approximately 10,000 for the preceding 4-week period to approximately 17,000 for the current period. The incidence was, however, less than 75 percent of the incidence in 1940 and less than 90 percent of the preceding 5-year median number of cases for the corresponding period. In the East North Central region the incidence was slightly below normal and in the West North Central region the number of cases stood at about the average seasonal level, but all other regions reported a relatively high incidence.

Meningococcus meningitis.—The incidence of meningococcus meningitis (143 cases) was also higher than it was during the corresponding period in 1940, but lower than the 1936–40 average incidence (158 cases). Eleven of the 19 cases reported from the New England region occurred in Massachusetts, the incidence in that region being the highest on record for this period. In all other regions except the West North Central the number of cases was comparatively low.

Scarlet fever.—For the current period there were 11,821 cases of scarlet fever reported, as compared with 11,519, 14,672, and 15,128 for the corresponding period in 1940, 1939, and 1938, respectively. Very significant declines from the expected seasonal incidence were reported from the Middle Atlantic and North Central regions, with minor declines in the West South Central, Mountain, and Pacific regions. In the New England, South Atlantic, and East South Central regions the incidence was a little above normal.

Smallpox.—The number of cases of smallpox was also relatively low, 70 as compared with 220 in 1940 and an average of 636 cases for the corresponding period in the years 1936–40. The 6 cases reported from the West South Central region were the highest number recorded in that region since 1934, with the exception of tne year 1937 when smallpox was unusually prevalent in the Central and Western States. For the country as a whole the current incidence is the lowest on record for this period.

Typhoid fever.—For the country as a whole the number of cases (414) of typhoid fever reported for the 4 weeks ended December 27 was the lowest in the 13 years for which these data are available. In the Pacific region the number of cases stood at the normal seasonal level, while the New England and South Atlantic regions reported a few more cases than might normally be expected; all other regions reported a relatively low incidence.

Whooping cough —For the 4 weeks ended December 27 there were 13,465 cases of whooping cough reported, approximately 85 percent of the normal seasonal expectancy. The Atlantic coast regions reported declines from the 1938–40 median figures for this period, but all other regions reported a relatively high incidence, the East North Central and Pacific regions reporting the largest increases, with minor increases in the West North Central, South Central, and Mountain regions.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended December 27, based on data received from the Bureau of the Census, was 11 8 per 1,000 inhabitants (annual basis) The rate for the corresponding period in 1940 was 12 3 and the average rate for the years 1938–40 was 12 2. The current low rate is no doubt due, in part at least, to the absence of any widespread outbreak of influenza, the cases in the areas most affected apparently being quite mild.

DEATHS DURING WEEK ENDED JANUARY 3, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Jan 3, 1942	Corresponding week 1941
Data from 86 large cities of the United States		
Total deaths	8 960	9,194
Average for 3 prior years	9 137	--
Total deaths, 53 weeks	440 103	441 759
Deaths per 1,000 population, 53 weeks, annual rate	11 7	11 7
Deaths under 1 year of age	564	581
Average for 3 prior years	565	----
Deaths under 1 year of age, 53 weeks	[illegible] 924	26 634
Data from industrial insurance companies		
Policies in force	64 826 273	64 796 540
Number of death claims	10 639	10 108
Death claims per 1,000 policies in force annual rate	8 6	8 2
Death claims per 1,000 policies, 53 weeks, annual rate	9 3	9 5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JANUARY 10, 1942

Summary

As compared with last week, slight increases were recorded for the current week in the incidence of diphtheria, influenza, measles, scarlet fever, and whooping cough, although each of the 9 diseases included in the following table and for which comparable figures are available, except measles, poliomyelitis, and whooping cough, was below the 5 year (1937–41) median.

A total of 3,800 cases of influenza was reported, as compared with 3,093 for the preceding week. Texas, with 1,520 cases, reported 40 percent of the total. For the corresponding week last year nearly 78,000 cases were reported. The 5-year median expectancy is 9,630 cases. The highest current incidence is in the South Atlantic and West South Central States.

Fourteen cases of amebic dysentery were reported (5 in Texas), 38 cases of bacillary (26 in Texas), and 17 cases of unspecified dysentery (16 in Virginia). Of 38 cases of tularemia, 10 were reported in Kentucky; and of 66 cases of endemic typhus fever, 20 were reported in Georgia, 9 each in Louisiana and Texas, and 8 in South Carolina. Twenty-eight cases of poliomyelitis were reported, as compared with 39 last week and a 5-year median of 21 cases.

Five cases of psittacosis were reported in Cleveland, Ohio, on January 14.[1]

A large number of cases of eye infection were reported on the West Coast, stated to be among welders in shipyards. Investigations were being undertaken to determine the cause.

The crude death rate for 88 large cities in the United States for the current week is 13.6 per 1,000 population, as compared with 12.7 for the preceding week and a 3-year (1939–41) average of 13.4 for the corresponding week.

[1] See page 105.

Telegraphic morbidity reports from State health officers for the week ended January 10, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report while leaders imply that, although none were reported, cases may have occurred

Division and State	Diphtheria			Influenza			Measles			Meningitis meningococcus		
	Week ended		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41
	Jan 10 1942	Jan 4, 1941		Jan 10 1942	Jan 4, 1941		Jan 10 1942	Jan 4, 1941		Jan 10 1942	Jan 4 1941	
NEW ENG												
Maine	1	0	2	1	40	13	174	37	74	1	2	0
New Hampshire	0	0	0				11	11	11	0	0	0
Vermont	1	0	0		99		7	24	24	1	0	0
Massachusetts	5	1	6				213	384	354	4	3	2
Rhode Island	0	0	0	1			38	0	1	0	0	0
Connecticut	0	0	2	7	10	10	110	12	143	2	0	1
MID ATL												
New York	16	15	24	[1] 8	[1] 77	[1] 44	493	1 471	375	7	3	5
New Jersey	7	9	17	18	20	20	134	582	437	3	1	1
Pennsylvania	23	16	37				1 121	1 457	83	2	5	2
E NO CEN												
Ohio	12	7	28	26	56	7	95	479	37	1	0	4
Indiana	13	13	17	49	236	46	42	33	11	2	0	1
Illinois	41	25	32	18	34	22	89	975	45	0	0	3
Michigan [2]	3	6	6	24	6		83	693	189	0	1	1
Wisconsin	1	0	2	31	64	62	[illegible]	369	359	2	0	0
W NO CEN												
Minnesota	2	0	4	1	2	1	208	5	38	0	0	0
Iowa	11	18	4		43	2	90	132	51	1	0	1
Missouri	2	8	11	10	[illegible]	96	27	29	7	0	0	1
North Dakota	2	12	2	36	172	46	71	10	10	1	0	0
South Dakota	2	3	3			6	2	2	2	0	0	0
Nebraska	2	2	2	9	5	10	4	2	8	0	0	1
Kansas	6	3	[illegible]	9	2 453	238	186	112	101	2	0	2
SO ATL												
Delaware	1	1	2				1	17	6	0	0	0
Maryland [2]	[illegible]	2	4	11	[illegible]	[illegible]	[illegible]	4	11	2	1	1
Dist of Col	0	1	6	[illegible]	[illegible]	2	[illegible]	2	3	0	0	1
Virginia	29	13	22	346	[illegible]	454	1	[illegible]	112	1	1	2
West Virginia	[illegible]	8	11	[illegible]	430	[illegible]	232	61	28	0	0	0
North Carolina	[illegible]	13	43	[illegible]	1	24	[illegible]	[illegible]	[illegible]	1	0	2
South Carolina	[illegible]	11	13	[illegible]	1 581	909	82	33	[illegible]	0	0	1
Georgia	13	5	[illegible]	105	788	133	225	8	[illegible]	2	1	0
Florida	7	1	10	1	[illegible]	7	23	2	11	1	0	3
E SO CEN												
Kentucky	6	4	13	2	9 601	[illegible]	[illegible]	101	101	0	1	2
Tennessee	11	4	12	[illegible]	[illegible]	[illegible]	40	2	2	0	2	3
Alabama	[illegible]	14	14	17	1 322	[illegible]	23	75	[illegible]	1	0	3
Mississippi [2]	16		6							1	2	1
W SO CEN												
Arkansas	[3] 4	[illegible]	12	[3] 192	6 516	283	[illegible]	16	16	[3] 0	0	1
Louisiana	13	9	12	7	[illegible]	42	13	2	3	0	1	1
Oklahoma	13	4	14	18	2 248	222	[illegible]	1	[illegible]	1	0	0
Texas	46	32	34	1 520	33 283	492	[illegible]	50	51	1	2	1
MOUNTAIN												
Montana	0	2	2	9	893	81	52	2	8	0	0	0
Idaho	0	0	0		8	4	1	0	53	0	0	0
Wyoming	0	0	0	4	[illegible]		14	0	4	0	0	0
Colorado	12	3	5	62	1 066	[illegible]	124	92	43	0	0	0
New Mexico	1	0	5	[illegible]	220	8	29	[illegible]	10	0	0	1
Arizona	1	2	8	19	[illegible]	178	87	[illegible]	6	0	2	2
Utah [2]	0	1	0	9	2 344	7	48	13	48	1	0	0
Nevada	0				250		4			0		
PACIFIC												
Washington	0	0	1	2	1 122		31	18	32	2	0	0
Oregon	2	0	1	21	1 172	171	83	29	23	0	0	0
California	17	16	30	108	3 030	163	1 495	34	90	2	3	3
Total	405	301	639	3 800	77 820	9 630	7 892	7 816	6 670	45	31	60

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended January 10, 1942, and comparison with corresponding week of 1941 and 5-year median—Continued

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Jan 10, 1942	Jan 4, 1941		Jan 10, 1942	Jan. 4, 1941		Jan 10, 1942	Jan 4, 1941		Jan 10, 1942	Jan 4, 1941	
NEW ENG.												
Maine	2	0	0	11	7	11	0	0	0	0	0	0
New Hampshire	1	0	0	11	3	4	0	0	0	0	0	0
Vermont	1	0	0	8	10	9	0	0	0	0	0	0
Massachusetts	1	0	0	303	120	142	0	0	0	2	1	1
Rhode Island	0	0	0	13	4	6	0	0	0	0	0	0
Connecticut	0	1	0	24	84	68	0	0	0	1	0	0
MID ATL.												
New York	0	2	2	367	263	361	0	0	0	4	3	4
New Jersey	1	0	0	120	144	144	0	0	0	0	0	1
Pennsylvania	1	0	0	292	258	281	0	0	0	9	10	9
E NO CEN.												
Ohio	1	7	1	290	264	318	0	1	4	3	1	4
Indiana	1	2	0	70	103	187	2	0	15	2	1	1
Illinois	0	3	3	199	309	421	0	3	12	3	6	3
Michigan [2]	0	0	0	100	156	248	0	8	0	0	1	1
Wisconsin	0	0	1	145	118	181	0	5	5	0	1	1
W NO CEN												
Minnesota	0	1	1	69	47	101	1	5	9	0	5	0
Iowa	1	1	0	24	45	94	0	1	16	0	1	1
Missouri	0	0	0	33	51	126	1	0	11	1	2	2
North Dakota	0	0	0	16	5	28	0	1	8	0	0	0
South Dakota	2	1	0	51	14	29	0	2	5	0	0	0
Nebraska	0	0	0	[illegible]	33	37	0	1	3	1	0	0
Kansas	0	0	0	84	67	167	0	0	7	0	0	2
SO ATL												
Delaware	0	0	0	40	12	14	0	0	0	1	0	0
Maryland [2]	1	2	0	55	27	54	0	0	0	4	1	2
Dist of Columbia	0	0	0	10	10	11	0	0	0	0	0	0
Virginia	0	3	0	32	46	54	0	0	0	8	1	2
West Virginia	1	2	0	62	48	60	0	0	0	0	3	2
North Carolina	0	0	0	102	50	52	0	0	0	2	1	1
South Carolina	1	0	0	13	17	10	0	0	0	8	0	4
Georgia	0	0	1	27	13	18	0	0	0	6	3	3
Florida	1	3	0	7	3	9	1	0	0	3	0	1
E SO CEN												
Kentucky	0	2	1	60	45	63	0	0	0	2	0	1
Tennessee	1	0	0	48	37	38	1	0	0	0	1	1
Alabama	1	0	0	36	47	22	0	1	0	3	2	2
Mississippi [3]	1	0	0	20	10	11	0	0	0	0	0	1
W SO CEN												
Arkansas	[3] 1	0	0	7	11	18	0	0	2	1	1	1
Louisiana	0	0	1	9	5	18	0	0	0	3	12	11
Oklahoma	1	0	0	16	15	28	1	0	8	1	0	2
Texas	2	1	1	54	46	73	1	0	0	5	9	9
MOUNTAIN												
Montana	1	0	0	26	26	35	0	0	4	0	0	0
Idaho	0	0	0	5	5	14	0	0	7	1	0	0
Wyoming	0	0	0	5	1	9	0	0	0	0	0	0
Colorado	0	0	0	24	30	33	1	8	6	0	1	1
New Mexico	0	0	0	10	6	10	0	0	0	3	3	3
Arizona	0	0	0	7	5	5	0	0	0	0	0	2
Utah [2]	0	0	0	21	7	18	0	0	0	0	0	0
Nevada	0	-	----	0	------	-----	0	------	------	0	----	------
PACIFIC												
Washington	0	2	1	52	29	48	0	0	5	1	0	1
Oregon	2	2	1	12	11	34	0	0	5	0	2	2
California	2	2	2	86	78	207	1	1	12	6	4	4
Total	28	37	21	3,101	2,695	4,459	10	37	276	84	76	98

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended January 10, 1942 and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Whooping cough, Week ended— Jan. 10, 1942	Whooping cough, Week ended— Jan. 4, 1941	Week ended January 10, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	29	50	0	0	0	0	0	0	0	0	0
New Hampshire	30	5	0	0	0	0	0	0	0	0	0
Vermont	33	15	0	0	0	0	0	0	0	0	0
Massachusetts	265	260	0	0	0	0	0	0	0	0	0
Rhode Island	61	11	0	0	0	0	0	0	0	0	0
Connecticut	78	71	0	0	0	0	0	0	0	0	0
MID. ATL.											
New York	665	375	0	2	7	0	1	0	0	0	2
New Jersey	234	103	0	1	0	0	1	0	0	1	0
Pennsylvania	283	524	1	2	0	0	0	0	0	0	0
E. NO. CEN.											
Ohio	227	245	0	0	0	0	0	0	0	0	0
Indiana	29	19	0	0	0	0	0	0	0	3	0
Illinois	174	145	0	2	0	0	0	1	0	7	0
Michigan [2]	166	198	0	0	1	0	0	0	0	0	0
Wisconsin	207	98	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	34	39	0	0	0	0	1	0	0	0	0
Iowa	11	9	0	0	0	0	0	0	0	1	0
Missouri	17	17	0	0	0	0	0	0	0	0	0
North Dakota	6	16	0	0	0	0	0	0	0	0	0
South Dakota	12	1	0	0	0	0	0	0	0	0	0
Nebraska	10	8	0	0	0	0	0	0	0	0	0
Kansas	59	85	0	0	0	0	0	0	0	1	0
SO. ATL.											
Delaware	0	14	0	0	0	0	0	0	0	0	0
Maryland [2]	21	59	0	0	0	1	0	0	0	3	0
Dist. of Col.	38	13	0	0	0	0	0	0	0	2	0
Virginia	46	106	0	0	0	16	0	0	0	3	0
West Virginia	40	42	0	0	0	0	0	0	0	0	0
North Carolina	295	192	0	0	0	0	0	0	0	2	6
South Carolina	30	55	0	0	0	0	0	0	0	0	8
Georgia	18	22	0	0	0	0	0	0	0	0	20
Florida	24	6	0	0	1	0	0	0	0	0	1
E. SO. CEN.											
Kentucky	75	22	0	0	0	0	0	0	0	10	0
Tennessee	20	17	0	1	0	0	0	0	0	0	1
Alabama	13	18	0	0	0	0	1	0	0	1	7
Mississippi [2]	-----	------	0	0	0	0	0	0	0	2	3
W. SO. CEN.											
Arkansas	3	10	0	1	0	0	0	0	0	0	0
Louisiana	1	4	0	0	0	0	0	2	0	0	9
Oklahoma	1	26	0	0	0	0	0	0	0	0	0
Texas	81	232	0	5	26	0	1	0	0	0	9
MOUNTAIN											
Montana	25	13	0	0	0	0	0	0	0	0	0
Idaho	1	3	0	0	0	0	0	0	0	2	0
Wyoming	16	8	0	0	0	0	0	0	0	0	0
Colorado	27	23	0	0	0	0	0	0	0	0	0
New Mexico	53	15	0	0	0	0	0	0	0	0	0
Arizona	21	20	0	0	0	0	0	0	0	0	0
Utah [2]	44	32	0	0	0	0	0	0	0	0	0
Nevada	4	------	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	137	43	0	0	0	0	0	0	0	0	0
Oregon	35	6	0	0	0	0	0	0	0	0	0
California	165	154	0	0	3	0	1	0	0	0	0
Total	3,864	3,449	1	14	38	17	6	3	0	38	66

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Corrected report for Arkansas, week ended Jan. 3, 1942 Diphtheria, 12, influenza, 93; measles, 77; meningitis, meningococcus, 3, poliomyelitis, 2.

WEEKLY REPORTS FROM CITIES

City reports for week ended December 27, 1941

This table lists the reports from 134 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine											
Portland	0	----	0	0	3	7	0	0	1	1	26
New Hampshire											
Concord	0	----	0	0	1	2	0	0	0	0	8
Nashua	0	----	0	0	0	0	0	0	0	4	8
Vermont											
Barre	0	----	----	0	----	2	0	----	0	1	----
Burlington	0	--	0	0	0	0	0	0	0	5	9
Rutland	0	----	0	0	0	0	0	0	0	0	2
Massachusetts											
Boston	0	----	1	33	17	44	0	6	1	20	236
Fall River	1	----	0	1	0	28	0	0	0	0	27
Springfield	0	----	0	9	1	14	0	0	0	15	33
Worcester	0	----	0	1	5	9	0	0	0	10	42
Rhode Island											
Pawtucket	1	----	0	12	1	0	0	0	0	0	8
Providence	1	----	0	7	6	7	0	1	0	11	72
Connecticut											
Bridgeport	0	----	0	1	2	2	0	0	0	2	----
Hartford	0	----	0	2	3	2	0	0	0	2	----
New Haven	0	----	0	26	3	2	0	1	0	0	51
New York											
Buffalo	0		0	0	4	16	0	8	0	2	123
New York	10	10	1	15	74	136	0	58	2	205	1,520
Rochester	0	----	0	1	1	7	0	1	0	5	66
Syracuse	0	----	0	1	1	4	0	0	0	21	54
New Jersey											
Camden	4	1	1	2	3	1	0	0	0	3	21
Newark	0	8	0	19	6	21	0	1	0	32	105
Trenton	0	1	2	0	0	1	0	0	0	3	----
Pennsylvania											
Philadelphia	4	1	1	3	17	67	0	17	0	39	386
Pittsburgh	1	----	0	7	15	18	0	7	0	2	171
Reading	0	----	1	0	2	1	0	0	0	1	----
Scranton	0	----	----	2	----	0	0	----	0	0	----
Ohio											
Cincinnati	0	-	0	0	1	13	0	5	0	6	120
Cleveland	4	11	0	2	10	30	0	13	0	26	197
Columbus	3	1	1	4	4	7	0	3	0	0	84
Toledo	0	---	0	1	3	12	0	4	0	12	60
Indiana											
Anderson	0		0	0	0	0	0	0	0	3	10
Fort Wayne	0	--	----	0	----	1	0	----	0	0	----
Indianapolis	4	--	0	6	12	18	0	6	0	14	112
Muncie	0	--	0	0	0	0	0	0	0	0	8
South Bend	0	-	0	0	0	2	0	0	0	0	20
Terre Haute	0	-	0	0	4	0	0	0	0	0	21
Illinois											
Alton	1	-	0	0	0	0	0	0	0	1	7
Chicago	20	7	3	12	22	68	0	27	0	102	664
Elgin	0	---	0	0	1	0	0	0	0	2	11
Moline	0	---	0	0	0	2	0	0	0	6	11
Springfield	0	-	0	0	1	0	0	0	0	0	25
Michigan											
Detroit	6	2	0	10	4	40	0	8	0	34	243
Flint	0		0	0	6	2	0	0	0	1	27
Grand Rapids	0	--	0	2	0	2	0	0	0	5	32
Wisconsin											
Kenosha	0	---	0	0	1	0	0	0	0	0	20
Madison	0	---	0	1	0	1	0	1	0	6	14
Milwaukee	0	---	0	6	4	15	0	2	0	119	90
Racine	0	----	----	2	----	5	0	----	0	14	----
Superior	0	--	0	1	0	3	0	0	0	8	10
Minnesota											
Duluth	0	--	0	2	0	7	0	0	0	2	13
Minneapolis	0		1	1	4	8	0	1	0	0	77
St Paul	0	----	0	45	2	3	0	0	0	15	56

City reports for week ended December 27, 1941—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Iowa											
Cedar Rapids	0			0		0	0		0	0	
Davenport	0			0		3	0		0	0	
Des Moines	0		0	0	0	5	0	0	0	0	34
Sioux City	1			2		0	0		0	1	
Waterloo	0			0		0	0		0	2	
Missouri											
Kansas City	0		2	3	4	7	0	2	0	0	92
St. Joseph	0		0	0	2	1	0	0	0	0	15
St. Louis	0	3	0	8	6	16	0	5	0	3	230
North Dakota											
Fargo	0		0	0	1	0	0	0	0	1	7
Grand Forks	0			0		0	0		0	0	
Minot	0		0	46	0	0	0	0	0	0	7
South Dakota											
Aberdeen	0			0		4	0		0	0	
Sioux Falls	0		0	0	0	0	0	0	0	0	14
Nebraska											
Lincoln	0			1		2	0		0	0	
Omaha	0		1	0	3	3	0	2	0	0	44
Kansas											
Lawrence	0		0	2	0	0	0	0	0	0	4
Topeka	0	1	0	1	0	6	0	0	0	9	23
Wichita	0	1		14	5	3	0		0	1	
Delaware											
Wilmington	0	1	1	0	3	10	0		0	0	
Maryland											
Baltimore	1	4	0	102	11	14	0	4	0	14	206
Cumberland	0		0	4	0	0	0	0	0	0	8
Frederick	0		0	0	0	0	0	0	0	0	4
Dist. of Col.											
Washington	0		0	0	11	13	0	7	1	3	181
Virginia											
Lynchburg	0		0	0	0	0	0	0	0	0	8
Norfolk	1		0	0	1	0	0	0	0	0	22
Richmond	0		1	0	1	7	0	0	0	0	54
Roanoke	0		0	0	0	0	0	0	0	0	21
West Virginia											
Charleston	0	2	0	0	1	2	0	0	0	0	6
Huntington	1			0		0	0		0	0	
Wheeling	0		0	1	1	0	0	1	0	0	21
North Carolina											
Gastonia	0			1		1	0		0	0	
Wilmington	0		0	3[illegible]	0	0	0	0	0	0	8
Winston-Salem	1		0	9	1	0	0	1	0	0	13
South Carolina											
Charleston	0	14		0	[illegible]	4	0		0	1	
Florence	0		0	0	0	0	0	0	0	0	2
Greenville	0		1	0	0	2	0	1	0	1	28
Georgia											
Atlanta	1	2		0	3	5	0		0	0	
Brunswick	0		0	0	1	0	0	0	0	0	7
Savannah	0	4	0	2[illegible]	0	1	0	0	0	1	26
Florida											
Miami	0	3	2	0	0	0	0	3	0	0	46
St. Petersburg	0		0	0	2	1	0	0	0	0	19
Tampa	0		0	0	0	0	0	0	0	0	26
Kentucky											
Ashland	0		0	0	0	0	0	0	0	3	6
Covington	0		0	0	1	0	0	3	0	0	20
Lexington	0		0	0	1	0	0	1	0	0	14
Louisville	0		0	1	9	19	0	2	1	19	65
Tennessee											
Knoxville	2		0	3	1	4	0	1	0	0	21
Memphis	2		1	1	2	1	0	4	0	2	76
Nashville	0		2	0	1	1	0	0	0	3	52
Alabama											
Birmingham	0	4	0	0	5	4	0	6	0	1	65
Mobile	0	1	0	0	2	2	0	0	0	0	25
Montgomery	2			1		1	0		0	0	
Arkansas											
Fort Smith	1			3		0	0		0	0	--
Little Rock	0	11	0	0	4	0	0	0	0	1	37
Louisiana											
Lake Charles	0		0	1	4	0	0	0	0	0	8
New Orleans	0		1	0	11	2	0	8	0	0	130
Shreveport	0		0	0	5	0	0	1	1	1	34
Oklahoma											
Oklahoma City	0	6	1	0	2	3	0	2	0	0	58
Tulsa	4	--	0	173	1	4	0	0	1	0	23

City reports for week ended December 27, 1941—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Texas											
Dallas	1	------	0	3	1	1	0	0	0	1	44
Fort Worth	1	------	0	0	7	2	0	0	0	1	41
Galveston	0	------	0	0	0	0	0	1	0	0	7
Houston	3	------	0	2	9	0	0	5	0	0	81
San Antonio	1	11	6	0	7	0	0	7	0	0	84
Montana											
Billings	0	----	--------	0	1	2	0	-------	0	0	--------
Great Falls	0	-----	0	10	1	2	0	0	0	3	8
Helena	0	----	0	0	0	1	0	0	0	0	7
Missoula	0	-----	0	0	0	1	0	0	0	0	4
Idaho											
Boise	0	-----	0	4	0	2	0	0	0	0	8
Colorado											
Denver	5	27	0	21	8	0	0	0	0	6	72
Pueblo	0	----	0	130	3	5	0	0	0	0	10
New Mexico											
Albuquerque	0	----	0	2	2	0	0	4	0	4	16
Arizona											
Phoenix	2	40	--------	3	------	1	0	------	0	3	--------
Utah											
Salt Lake City	2	----	0	1	1	2	0	0	0	2	50
Washington											
Seattle	0	----	1	0	6	4	0	3	0	34	107
Spokane	0	---	0	0	6	4	0	0	0	3	47
Tacoma	0	-	----	0	1	1	0	-----	0	0	--------
Oregon											
Portland	2	1	0	2	2	1	0	1	0	2	74
Salem	0	1	--------	0	-------	0	0	---	0	0	-------
California											
Los Angeles	3	11	0	11	5	14	0	15	1	12	264
Sacramento	1		0	33	5	0	0	0	0	1	36
San Francisco	0	1	1	4	6	4	0	5	0	8	157

State and city	Meningitis, meningococcus Cases	Meningitis, meningococcus Deaths	Poliomyelitis cases
Massachusetts			
Worcester	1	0	0
New York			
New York	4	2	2
New Jersey			
Newark	1	0	0
Pennsylvania			
Pittsburgh	1	0	1
Michigan			
Detroit	2	1	1

State and city	Meningitis, meningococcus Cases	Meningitis, meningococcus Deaths	Poliomyelitis cases
Minnesota			
Minneapolis	0	0	1
St Paul	0	0	1
Maryland			
Baltimore	1	0	0
District of Columbia			
Washington	1	0	0
Tennessee			
Knoxville	0	0	1
California			
Los Angeles	1	0	0

Encephalitis, epidemic or lethargic—Cases Missoula, 1 Deaths New York, 1
Pellagra—Cases Savannah, 4
Typhus fever—Cases Savannah, 1, New Orleans, 1, Los Angeles, 1 Deaths Savannah, 1.

Rates (annual basis) per 100,000 population for a group of 89 selected cities (population, 1940, 33,882,215)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
Week ended Dec 27, 1941	12.16	21.55	4.46	101.42	59.71	116.96	0.00	1.08	128.04
Average for week, 1936–40	20.84	284.63	14.62	278.73	114.79	184.00	3.42	3.11	166.43

PLAGUE INFECTION IN FLEAS FROM GROUND SQUIRRELS IN SHASTA COUNTY, CALIF.

Under date of Dec. 31, 1941, report was received of plague infection proved, by animal inoculation and cultures, in a pool of 24 fleas from 3 golden mantled ground squirrels (identified as *C. douglasii,* probably *Citellus lateralis* sp.) shot Oct. 24 on property located 26 miles north of Redding, Shasta County, Calif.

PSITTACOSIS IN CLEVELAND, OHIO

On January 14, 1942, Dr. R. H. Markwith, State Director of Health of Ohio, reported the occurrence of 5 cases of psittacosis in Cleveland. Investigations were being conducted to determine the source of the infection, and appropriate control measures were being instituted.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended December 13, 1941.—During the week ended December 13, 1941, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	1	3	1	3	6					14
Chickenpox		14	2	227	497	118	79	39	116	1,092
Diphtheria		17		12	3	5			4	41
Dysentery				1						1
Influenza		11				31			22	64
Lethargic encephalitis					1				1	2
Measles			3	243	74	23	47	1	27	418
Mumps				446	293	59	163	11	154	1,126
Pneumonia		5			3	1	1		5	15
Poliomyelitis			5	1					2	8
Scarlet fever	7	21	10	100	216	27	18	33	11	443
Tuberculosis	3	3	6	40	51	2	33			138
Typhoid and paratyphoid fever				7					3	10
Whooping cough		34		95	160	2	1	4	28	324

CUBA

Habana—Communicable diseases—4 weeks ended November 15, 1941.—During the 4 weeks ended November 15, 1941, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	15		Measles	10	
Leprosy	4	1	Tuberculosis	6	
Malaria	22		Typhoid fever	26	3

Provinces—Notifiable diseases—4 weeks ended December 6, 1941.—During the 4 weeks ended December 6, 1941, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	2	1	3	5		5	16
Chickenpox				1			1
Diphtheria	1	19	3	3	1	4	31
Leprosy			2		1	1	4
Malaria	280	55	1	23	153	559	1,071
Measles		34	7				41
Hookworm disease		40				2	42
Scarlet fever		2					2
Trachoma				3			3
Tuberculosis	16	64	21	33	2	35	171
Typhoid fever	11	32	6	26	9	22	106
Yaws						56	56

[1] Includes the city of Habana.

FINLAND

Communicable diseases—October 1941.—During the month of October 1941, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	154	Poliomyelitis	3
Dysentery	2	Scarlet fever	203
Influenza	682	Typhoid fever	77
Paratyphoid fever	105		

JAMAICA

Communicable diseases—4 weeks ended December 20, 1941.—During the 4 weeks ended December 20, 1941, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	4	10	Puerperal sepsis		1
Diphtheria	3	4	Scarlet fever	3	
Dysentery	1	3	Tuberculosis	30	74
Leprosy	1	2	Typhoid fever	6	48

PERU

Notifiable diseases—Year 1940.—During the year 1940, cases of certain notifiable diseases were reported in Peru as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	46	Plague	182
Diphtheria	689	Poliomyelitis	62
Dysentery	5,650	Scarlet fever	290
Influenza	40,695	Smallpox	455
Leprosy	23	Typhoid and paratyphoid fever	2,922
Lethargic encephalitis	8	Typhus fever	1,252
Malaria	44,162	Undulant fever	81
Measles	2,796	Whooping cough	17,041

SCOTLAND

Vital statistics—Quarter ended September 30, 1941.—Following are provisional vital statistics for Scotland for the quarter ended September 30, 1941:

	Number	Rate per 1,000 population		Number	Rate per 1,000 population
Marriages	13,076	10.1	Deaths from—Continued:		
Births	22,652	17.5	Homicide	7	
Deaths	14,464	11.6	Influenza	25	
Deaths under 1 year of age	1,424	[1] 63	Lethargic encephalitis	1	
Deaths from			Measles	8	
Appendicitis	67		Nephritis, acute and chronic	295	
Cancer	2,100	1.72	Pneumonia (all forms)	438	.36
Cerebral hemorrhage and apoplexy	1,574		Poliomyelitis	5	
Cerebrospinal fever	38		Puerperal sepsis	41	
Cirrhosis of the liver	35		Scarlet fever	4	
Diabetes mellitus	134		Senility	436	
Diarrhea and enteritis (under 2 years of age)	232		Suicide	96	
Diphtheria	88		Syphilis	61	
Dysentery	7		Tetanus	2	
Erysipelas	4		Tuberculosis (all forms)	914	.73
Heart disease	3,196		Typhoid and paratyphoid fever	8	
			Whooping cough	83	

[1] Per 1,000 live births

NOTE.—All deaths in the above table are of civilians only.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-named diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

Smallpox

Guatemala.—During the month of November 1941, 1 case of smallpox was reported in Guatemala.

Yellow Fever

Colombia.—Yellow fever has been reported in Colombia as follows: Antioquia Department—Remedios, Nov. 5, 1941, 1 death. Intendencia of Meta—San Martin, Nov. 12, 1 death; Villavicencio, Nov. 12, 1 death. Santander Department—San Vincente de Chucuri, Nov. 10, 1 death.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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DIVISION OF SANITARY REPORTS AND STATISTICS

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Public Health Reports

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Public Health Reports

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ISOLATION OF COCCIDIOIDES FROM SOIL AND RODENTS[1]

By C. W. Emmons, *Senior Mycologist, United States Public Health Service*

The assumption that coccidioides exists in man's environment, independently and without necessary relation to human cases of coccidioidomycosis, has always seemed necessary in explaining the peculiar epidemiology of the disease. Even in areas where the disease is so common that most of the residents are sensitized to coccidioidin and probably have at some time been infected, coccidioidomycosis apparently is never transmitted directly from one individual to another. The parasitic growth phase of *Coccidioides immitis* in tissues is infectious when experimentally introduced into animals, but apparently is not effective in the natural direct transmission of the disease. When the fungus is isolated from tissues and placed on a nonliving substratum it grows as a mold and produces enormous numbers of spores which are both infectious and easily disseminated. Accidental laboratory infections and the experimental infection of guinea pigs show that inhalation of these spores from the saprophytic growth phase of the fungus produces coccidioidomycosis. An early acute respiratory episode which characterizes primary coccidioidomycosis and occurs also in many cases of progressive coccidioidomycosis points toward the respiratory system as the probable portal of entry in most cases of the disease.

Epidemiological studies (*1*) and the known exposure to dust in particular cases (*2*) have led investigators to conclude that the spores of the fungus are present in some windblown dust and that therefore the fungus was probably growing in the soil from which the dust originated. It is, in fact, generally assumed that the fungus grows in the soil following rains and that during dry weather the spores mature and are disseminated. This conception seems to accord with known epidemiological features of the disease, but it has never been

[1] From the Division of Infectious Diseases, National Institute of Health.

fully substantiated and there are reasons for doubting its correctness. Actual isolation of coccidioides from soil has been reported only twice. Stewart and Meyer (*3*) reported isolation from soil collected near the bunkhouse of a ranch where there were 4 cases of coccidioidal granuloma. This soil may have been heavily contaminated by pus or sputum from these infected men. Smith and Baker (*4*) have isolated it from a site in San Benito County, California, but have not yet reported the details of this isolation.

During the summer of 1941 coccidioides was isolated from 5 of 150 soil samples collected in the desert near the village of San Carlos, Arizona (*5*). The results of this study will be reported in more detail in a later paper. The investigation was undertaken with the cooperation of Dr. J. D. Aronson and following Aronson's demonstration (*6*) that a very high percentage of Indian school children on the San Carlos Indian Reservation were sensitized to coccidioidin. The prevalence of positive coccidioidin reactions indicated a probable extension of the endemic areas of coccidioidomycosis to this region. Supporting the evidence from skin tests, reports were obtained of illnesses occurring in the past which, when examined in retrospect, probably were cases of primary coccidioidomycosis. Laboratory proof in these cases is lacking and cannot now be obtained. No human case of the disease has yet been definitely established in the San Carlos area.

From information obtained during the attempts to isolate coccidioides from San Carlos soil it became increasingly apparent that the conception of coccidioides as a soil-inhabiting fungus must be revised. Coccidioides is a rapidly growing fungus and should be relatively easy to isolate from soil if it were growing freely as a saprophyte in this substratum. Experiences of investigators have shown that it is, on the contrary, very difficult to isolate from this source. Further, on theoretical grounds, it seems improbable that a fungus which is so virulent for man and animals should have a natural habitat as a saprophyte in the soil.

A search for an animal reservoir seemed indicated. It is known that coccidioidomycosis occurs sporadically in cattle, sheep, and dogs, but it is probably an accidental infection in these animals as in man. There is no reason to believe that these species represent natural reservoirs of the disease. The prevalence of small rodents on the desert suggested that if a natural infection existed in these animals they might constitute an extremely important factor in the unusual distribution and epidemiology of the disease. The susceptibility of deer mice had been previously demonstrated by experimental infection in this laboratory (*5*).

A new approach was therefore made and when studies were resumed at San Carlos 105 wild rodents were trapped in a preliminary search for infected animals. Deer mice (*Peromyscus*), pocket mice (*Perog-*

nathus), grasshopper mice (*Onychomys*), kangaroo rats (*Dipodomys*), pack rats (*Neotoma*), and a ground squirrel (*Citellus*) were caught and examined. Fungi were found upon direct examination or by culture in 25 animals, distributed among 6 species of rodents, viz, *Peromyscus eremicus*, *Perognathus baileyi*, *P. penicillatus*, *P. intermedius*, *Dipodomys merriami*, and *Citellus harrisii*. Species of the genus *Perognathus* appear to be especially important hosts of the fungus. Among 26 specimens of this genus, 21, or 80 percent, had fungus infections. The fungi from at least three of these animals are strains of coccidioides. The other strains isolated and the tissues preserved for pathological examination are still being studied and will be discussed in a later paper.

In the San Carlos area coccidioides has now been isolated from soil and from rodents, but has not yet been isolated from a human case of the disease. Small rodents appear to constitute an important natural reservoir of coccidioides. This may explain, on the one hand, the presence of the spores of the fungus in wind-blown soil contaminated by infected animals, and, on the other hand, the difficulty of isolating the fungus from soil in which it has a highly localized and spotty distribution.

ACKNOWLEDGMENTS

This work was made possible through the courtesy and cooperation of the medical personnel of the Office of Indian Affairs; of Mr. Ernest R. McCray, Superintendent of the San Carlos Agency; Dr. Robert D. Cunningham, who supplied laboratory space in the San Carlos Hospital; and Mrs. Mabel C. Head, field nurse. I am indebted for assistance in the preliminary field determination of species of rodents to Dr. Charles T. Vorhies, University of Arizona, and for final determinations of prepared specimens to Dr. David H. Johnson, National Museum.

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STUDIES ON THE DURATION OF DISABLING SICKNESS

III. Duration of Disability From Sickness and Nonindustrial Injuries Among the Male Employees of an Oil Refining Company with Particular Reference to the Older Worker, 1933–39, Inclusive[1]

By William M. Gafafer, *Senior Statistician*, Rosedith Sitgreaves, and Elizabeth S. Frasier, *Junior Statistician, United States Public Health Service*

INTRODUCTION

The first paper of the series (*1*) presented material on the duration of disabling sickness and nonindustrial injuries causing absence from work for 8 calendar days or longer among the male and female memberships of 25 industrial sick benefit organizations with waiting periods and maximum benefit periods of varying length; the second paper (*2*) dealt with the duration of disability lasting one calendar day or longer among the male employees of a public utility company with no waiting period and a maximum benefit period of 52 weeks.

The present paper, the third of the series, based on the recorded disability experience of male workers of an oil refining company,[2] gives two basic duration tables specific for the age groups under 50 years of age and 50 years of age and over, and for the four broad cause groups, nonindustrial injuries, respiratory diseases, digestive diseases, and nonrespiratory-nondigestive diseases. The experience of the older worker is further investigated by means of the ratios of the corresponding rates for the two age groups.

The males in the record are principally white and the analysis covers the 7 years, 1933–39. The supporting data are drawn from the records of the sick benefit organization connected with the company; a brief review of the rules governing the organization will be found in reference *3*. Only recorded absences of 8 calendar days or longer are considered, the duration of the absence in days being the number of days for which benefits were paid.

With respect to notification, verification, and certification of disability it may be noted that the organization requires that an absence be reported immediately and that satisfactory evidence of disability for work be furnished the company physician. According to the medical department of the company, the company physician, at each of the refineries, follows lost-time cases closely, making a consistent effort, among other things, to satisfy himself and the company medical department as to diagnoses.

Summary of basic data.—During the 7-year period a total of 67,745 male-years of membership yielded 8,700 absences of 8 days or longer on account of sickness and nonindustrial injuries, and 287,885 days of

[1] From the Division of Industrial Hygiene, National Institute of Health. For earlier papers in this series see references *1* and *2*.

[2] For an earlier report using data from the same source, see reference *3*.

disability. The average annual number of absences per 1,000 males was 128.4, and the average annual number of days lost per male was 4.250. Of the 8,700 absences 6,080, yielding 172,110 days of disability, were among males under 50 years of age, and 2,612 absences, resulting in 115,493 days lost, were among males 50 years of age and over. No age was reported for 8 absences accounting for 282 days.

Since an age distribution of the male employees is available as of January 1, 1938, it is possible to apply the proportions of that distribution to the membership for the 7-year period and to obtain the approximate number of person-years of membership for each of the two age groups. According to the given distribution, 76.9 percent of the males were under 50 years of age while 23.1 percent fell in the older age group. These percentages correspond to 52,096 and 15,649 person-years of membership for the younger and older groups, respectively. With the use of these membership figures, it is found that the frequency and disability rates among males under 50 are 116.7 absences per 1,000 males and 3.304 days lost per male; for the older group the corresponding rates are 166.9 and 7.380.

The percentage distribution of the number of absences and the number of days of disability by broad cause and age groups are shown in the following table:

Age group	All sickness and nonindustrial injuries		Nonindustrial injuries	Respiratory diseases	Digestive diseases	Nonrespiratory-nondigestive diseases
	Number	Percent	Percent			
	Absences					
All ages [1]	8,700	100.0	9.9	44.8	13.6	31.7
Under 50 years	6,080	100.0	10.4	47.3	14.2	28.1
50 years and over	2,612	100.0	9.0	39.1	11.9	40.0
	Calendar days of disability					
All ages [1]	287,885	100.0	11.1	28.0	14.9	46.0
Under 50 years	172,110	100.0	12.0	31.8	17.8	38.4
50 years and over	115,493	100.0	9.8	22.3	10.4	57.5

[1] Contains a negligible number of absences of unknown age.

With respect to all ages it will be observed that while the respiratory diseases contribute almost one-half of the absences they account for less than one-third of the days lost; on the other hand, the nonrespiratory-nondigestive diseases account for less than one-third of the absences but are responsible for almost one-half of the days lost. The corresponding relationships for the age groups are also notable. While the relationships shown by the two percentage distributions

for the males under 50 years of age are more or less similar to the corresponding ones for all ages, the distributions for the age group 50 years and over show a shifting from the respiratory to the nonrespiratory-nondigestive group. Thus while the age group under 50 shows about 50 percent more absences from respiratory diseases than from nonrespiratory-nondigestive diseases, each of these disease groups accounting for about one-third of the total days lost, the age group 50 and over, on the other hand, shows approximately equal percentages of absences from the two disease groups but with days of disability for the nonrespiratory-nondigestive diseases amounting to about 2.5 times those from the respiratory diseases.

AVERAGE ANNUAL NUMBER OF ABSENCES PER 1,000 MALES OF SICKNESS AND NONINDUSTRIAL INJURIES DISABLING FOR A SPECIFIED NUMBER OF DAYS *t* OR MORE

Unlike a table showing the frequency of absences of a specific duration, say *t* days, the basic table (table 1) of this section presents the frequency of absences of *t* days or longer for values of *t* from 8 through 365 days. Thus each absence of *t* days in length contributes to one or more of the various frequencies for all sickness and nonindustrial injuries or a particular cause group, the number of the frequencies to which a contribution is made depending upon the duration of the absence. Thus the absence of 8 days' duration contributes only to the frequency of 8-day or longer absences while an absence of 10 days' duration contributes to three frequencies, namely, the frequency of absences lasting 8 days or longer, 9 days or longer, and 10 days or longer. In general as the *t* becomes larger the number of absences becomes smaller. When a particular set of absence durations is presented graphically with respect to the frequency of absences lasting *t* days or longer for various values of *t*, the initial plotted value will be determined by the total number of absences. Thus this frequency will be the maximum one and for this reason no curves of this type may have an upward slope. Should all of the absences be of the same length the graph of the frequencies would be a line parallel to the *t* axis. Should there be a relatively large number of long durations the graph would be a slowly decreasing curve; on the other hand a relatively large number of short absences would be reflected in a curve decreasing less slowly. It is pertinent to state in this connection that in the event two sickness experiences show equal frequencies of disabilities regardless of duration, graphs such as those described would be particularly useful in showing pictorially any possible differences in the two experiences with respect to duration of disability.

All ages.—The average annual number of absences per 1,000 males of sickness and nonindustrial injuries disabling for a specified number of days, *t* or more, is shown by broad cause group in table 1.

It is of interest to compare the rates for all ages with the rates shown in a similar table in the first paper of the series for males covered by 25 industrial sick benefit organizations (*1*). The frequency of absences lasting 8 calendar days or longer is consistently higher for each cause group in the present experience. The rates for all sickness and nonindustrial injuries, nonindustrial injuries, respiratory diseases and nonrespiratory diseases (a summation of digestive and non-

TABLE 1.—*Annual number of absences per 1,000 males, by broad age and cause groups, of sickness and nonindustrial injuries disabling for a specified number of days, t or more, experience of male employees of an oil refining company, absences lasting 8 calendar days or longer and ending during 1933–39, inclusive*

t days	All sickness and nonindustrial injuries			Nonindustrial injuries			Respiratory diseases			Digestive diseases			Nonrespiratory nondigestive diseases [1]			t days
	All ages [2]	Under 50 years	50 years and over	All ages [2]	Under 50 years	50 years and over	All ages [2]	Under 50 years	50 years and over	All ages [2]	Under 50 years	50 years and over	All ages [2]	Under 50 years	50 years and over	
	Annual number of absences per 1,000 males disabling for t days or more															
8	128.4	116.7	166.9	12.8	12.1	15.0	57.5	55.2	65.2	17.4	16.6	19.9	40.7	32.8	66.8	8
9	115.8	104.4	153.4	11.9	11.3	13.9	49.4	46.9	57.8	16.7	15.9	18.9	37.8	30.3	62.8	9
10	106.5	95.2	143.5	11.4	10.7	13.4	43.3	40.7	51.8	16.0	15.4	17.8	35.8	28.4	60.5	10
11	97.3	86.5	132.9	10.7	10.1	12.7	37.6	35.1	45.9	15.3	14.8	16.8	33.7	26.5	57.5	11
12	89.0	78.4	123.7	10.3	9.7	12.3	32.3	29.6	41.0	14.6	14.1	15.9	31.8	25.0	54.5	12
13	81.6	71.5	114.7	9.9	9.3	11.6	27.9	25.5	36.0	13.9	13.5	15.1	29.9	23.2	52.0	13
14	75.4	65.3	108.8	9.3	8.7	11.4	24.3	21.8	32.6	13.5	13.1	14.6	28.3	21.7	50.2	14
15	67.1	56.9	100.7	8.5	7.8	10.7	19.5	16.8	28.6	12.9	12.6	13.9	26.2	19.7	47.5	15
16	63.0	53.1	95.2	8.3	7.6	10.3	17.3	14.7	25.8	12.6	12.3	13.4	24.8	18.5	45.9	16
17	60.4	50.7	92.3	8.0	7.4	10.0	16.1	13.5	24.6	12.3	12.0	13.0	24.0	17.8	44.7	17
18	57.4	48.0	88.3	7.7	7.1	9.8	14.4	11.9	22.4	12.0	11.8	12.5	23.3	17.2	43.6	18
19	54.7	45.6	84.6	7.5	6.9	9.5	13.2	10.9	20.6	11.8	11.5	12.4	22.2	16.3	42.1	19
20	52.4	43.7	80.8	7.3	6.7	9.2	12.1	9.9	19.3	11.6	11.4	12.1	21.4	15.7	40.2	20
21	50.3	41.9	78.0	7.1	6.5	9.0	11.3	9.2	18.2	11.3	11.1	11.8	20.6	15.1	39.0	21
22	47.0	38.8	74.3	6.7	6.1	8.7	10.0	8.0	17.0	10.9	10.7	11.4	19.4	14.0	37.2	22
23	45.3	37.3	71.3	6.4	5.8	8.5	9.4	7.4	15.9	10.7	10.5	11.1	18.8	13.6	35.8	23
24	44.1	36.2	69.9	6.2	5.6	8.3	9.0	7.0	15.4	10.6	10.5	10.9	18.3	13.1	35.3	24
25	42.8	35.1	68.3	6.1	5.5	8.1	8.5	6.5	14.9	10.4	10.3	10.8	17.8	12.8	34.5	25
26	41.5	34.0	66.3	6.0	5.3	8.0	8.0	6.2	14.4	10.3	10.1	10.6	17.2	12.4	33.3	26
27	40.0	32.6	64.3	5.8	5.1	8.0	7.5	5.7	13.4	10.0	9.9	10.3	16.7	11.9	32.6	27
28	38.6	31.6	61.5	5.7	5.0	7.8	6.9	5.3	12.5	9.8	9.7	9.9	16.2	11.6	31.3	28
35	30.8	24.5	51.9	4.6	4.1	6.6	4.9	3.6	9.3	8.0	7.7	9.0	13.3	9.1	27.0	35
42	24.7	19.2	42.9	3.6	3.1	5.1	3.8	2.8	7.0	5.9	5.5	7.2	11.4	7.8	23.6	42
49	19.6	14.6	36.0	2.8	2.4	4.4	3.0	2.2	5.6	3.8	3.3	5.2	10.0	6.7	20.8	49
56	15.9	11.3	31.2	2.2	1.7	4.1	2.4	1.8	4.1	2.7	2.3	4.0	8.6	5.5	19.0	56
63	12.9	8.8	26.5	1.6	1.2	3.1	2.0	1.6	3.4	1.8	1.4	3.1	7.5	4.6	16.9	63
70	11.2	7.4	24.0	1.3	.8	2.8	1.8	1.4	3.0	1.3	1.1	2.3	6.8	4.1	15.9	70
77	9.8	6.3	21.2	1.0	.6	2.0	1.7	1.3	2.9	.9	.8	1.5	6.2	3.6	14.8	77
84	8.5	5.4	19.0	.8	.6	1.7	1.4	1.1	2.5	.8	.6	1.3	5.5	3.1	13.5	84
91	7.9	4.9	17.6	.7	.5	1.5	1.4	1.0	2.3	.7	.6	1.2	5.1	2.8	12.6	91
182	3.5	2.0	8.4	.3	.1	.8	.8	.7	1.1	.1	.1	.2	2.3	1.1	6.3	182
273	2.3	1.2	6.0	.1	.1	.4	.5	.4	.7	.1	0	.1	1.6	.7	4.8	273
364	1.6	.9	4.0	.1	[3] 0	.2	.4	.4	.6	[3] 0	0	.1	1.1	.5	3.1	364
365	1.5	.8	3.7	.1	[3] 0	.1	.4	.3	.6	[3] 0	0	.1	1.0	.5	2.9	365

See footnotes at end of table

TABLE 1.—*Annual number of absences per 1,000 males, by broad age and cause groups, of sickness and nonindustrial injuries disabling for a specified number of days, t or more, experience of male employees of an oil refining company, absences lasting 8 calendar days or longer and ending during 1933–39, inclusive*—Continued

t days	All sickness and nonindustrial injuries			Nonindustrial injuries			Respiratory diseases			Digestive diseases			Nonrespiratory-nondigestive diseases [1]			*t* days
	All ages [2]	Under 50 years	50 years and over	All ages [2]	Under 50 years	50 years and over	All ages [2]	Under 50 years	50 years and over	All ages [2]	Under 50 years	50 years and over	All ages [2]	Under 50 years	50 years and over	
	Number of absences disabling for *t* days or more															
8	8,700	6,080	2,612	835	629	235	3,897	2,874	1,021	1,180	866	311	2,758	1,711	1,045	8
9	7,844	5,437	2,400	801	586	217	3,351	2,444	905	1,129	830	298	2,560	1,577	982	9
10	7,214	4,962	2,245	770	560	209	2,934	2,121	811	1,094	803	278	2,426	1,478	947	10
11	6,594	4,508	2,079	727	527	199	2,547	1,827	718	1,037	772	262	2,283	1,382	900	11
12	6,028	4,086	1,935	698	505	192	2,185	1,542	641	990	738	249	2,155	1,301	853	12
13	5,525	3,723	1,795	669	486	182	1,891	1,326	563	943	704	236	2,022	1,207	814	13
14	5,112	3,402	1,703	632	453	178	1,618	1,135	511	917	685	229	1,915	1,129	785	14
15	4,547	2,964	1,576	577	405	168	1,321	872	447	877	656	218	1,772	1,028	743	15
16	4,266	2,760	1,490	559	397	161	1,170	767	401	854	641	210	1,683	964	718	16
17	4,092	2,641	1,444	542	384	157	1,030	703	385	833	627	203	1,627	927	699	17
18	3,892	2,503	1,382	524	370	153	974	622	350	814	615	196	1,580	896	683	18
19	3,709	2,378	1,324	512	362	149	892	567	323	799	602	194	1,506	847	658	19
20	3,546	2,275	1,265	495	350	144	819	516	302	784	591	190	1,448	818	629	20
21	3,407	2,182	1,220	482	340	141	763	479	284	765	577	185	1,397	786	610	21
22	3,187	2,019	1,163	452	315	136	682	415	267	739	558	178	1,314	731	582	22
23	3,066	1,945	1,116	434	300	133	637	388	249	725	549	173	1,270	708	561	23
24	2,986	1,887	1,094	423	292	130	608	367	241	718	545	170	1,237	683	553	24
25	2,902	1,829	1,099	414	286	127	574	341	233	707	536	169	1,207	666	540	25
26	2,812	1,770	1,038	405	[illegible]	126	545	320	225	695	527	166	1,167	645	521	26
27	2,711	1,701	1,006	393	267	125	507	298	209	680	516	162	1,131	620	510	27
28	2,612	1,645	963	386	263	122	470	274	196	662	505	155	1,094	603	490	28
35	2,090	1,275	812	314	211	103	333	187	146	544	402	140	899	475	423	35
42	1,674	1,001	671	243	164	79	255	145	110	401	287	112	775	405	370	42
49	1,327	762	563	193	124	69	205	118	87	254	171	81	675	349	326	49
56	1,078	588	488	151	87	64	161	96	65	181	117	62	585	288	297	56
63	874	458	415	109	60	49	135	81	54	124	75	48	506	242	264	63
70	762	385	376	87	43	44	122	75	47	92	55	36	461	212	249	70
77	662	329	332	65	34	31	113	68	45	65	40	24	419	187	232	77
84	577	279	297	56	30	26	97	57	40	53	32	20	371	160	211	84
91	532	256	276	50	27	23	91	54	37	48	29	19	343	146	197	91
182	235	104	131	18	6	12	51	34	17	9	5	4	157	59	98	182
273	155	61	94	9	3	6	34	23	11	3	1	2	109	34	75	273
364	109	46	63	5	1	4	30	20	10	1	0	1	73	25	48	364
365	101	43	58	3	1	2	29	18	10	1	0	1	69	24	45	365

[1] Includes a negligible number of absences of ill-defined or unknown diagnosis.
[2] Includes a negligible number of absences of unknown age
[3] Less than 0 05 absence per 1,000

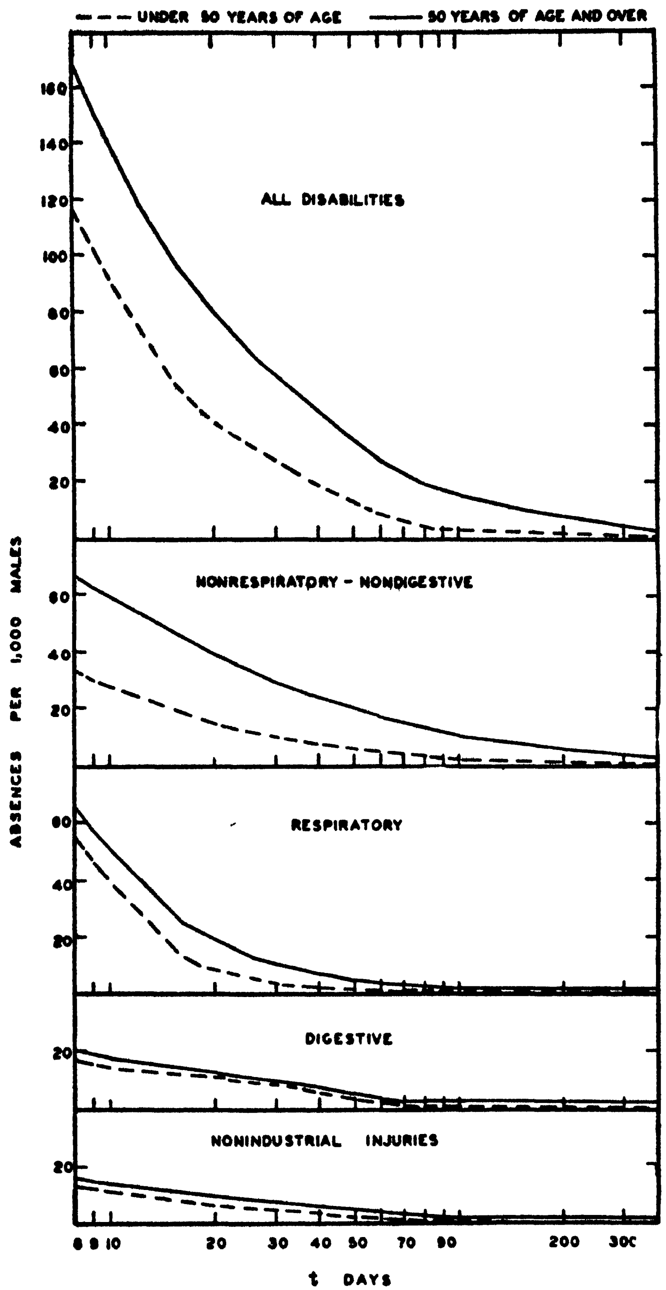

FIGURE 1.—Annual number of absences per 1,000 males of sickness and nonindustrial injuries disabling for a specified number of days, t or more, for ages under 50 years and 50 years and over, experience of male employees of an oil refining company, absences lasting 8 calendar days or longer and ending during 1933–39, inclusive. (Logarithmic horizontal scale.)

respiratory-nondigestive diseases) in the present instance are 128.4, 12.8, 57.5, and 58.1, respectively. Corresponding rates in the earlier study are 92.9, 9.7, 38.2, and 45.0, respectively. The excesses may be accounted for in part by the fact that the majority of the 25 organizations had a waiting period of 7 days, whereas there was no waiting period or only a 3-day waiting period for the oil refinery workers.

As t increases, however, the frequencies in the present experience decrease somewhat more rapidly than do the corresponding rates for the 25 industrial sick benefit organizations. It is possible to find for each cause group a t for which the frequencies of the 2 groups of workers are approximately equal, and after which the rates for the oil refinery workers are lower than the corresponding ones of the earlier study. Thus when t is 49 days, the average annual frequency of all sickness and nonindustrial injuries among the present group is 19.6 per 1,000 while the rate for the other group is 19.2. Corresponding t's for nonindustrial injuries, respiratory and nonrespiratory diseases are 77, 18, and 56, respectively. However, the frequency of absences lasting 364 days or longer for each cause group is approximately the same for the two groups of workers.

Frequencies by broad age group.—The pertinent data by broad age group are also shown in table 1 and are presented graphically in figure 1. It will be observed that for all causes of disability and for each cause group, as t varies from 8 through 365, the rate for male workers 50 years of age and over is consistently higher than the corresponding rate for males under 50 years of age. This difference in frequency is most marked for the nonrespiratory-nondigestive diseases and is least for the nonindustrial injuries and digestive diseases, respectively.

The most rapid decrease in rate for each age group is shown for the respiratory diseases where the initial frequency is approximately halved for the younger and older groups on the thirteenth and fourteenth days, respectively. Corresponding values for the other cause groups are: nonrespiratory-nondigestive diseases, the nineteenth and twenty-sixth days; nonindustrial injuries, the twenty-second day and fifth week; and digestive diseases, the fifth week and twenty-eighth day.

In comparing the frequencies of the two age groups it is of interest to note the value of t necessary in each cause group for the frequency among the workers 50 years of age and over to approximate the corresponding frequency of 8-day or longer absences among the younger group. Since in figure 1 the horizontal axis is, in reality, an axis of waiting periods,[3] this is equivalent to asking what waiting period would be necessary for the frequency of absences among the older

[3] The range of values is limited to those from 8 through 365.

group to be approximately equal to the frequency among the younger workers with a fixed waiting period of 7 days. For all sickness and nonindustrial injuries this relationship would exist if absences of only 13-days' duration or longer were included for the older males. Similar values of t for nonindustrial injuries, digestive, and respiratory diseases are 12, 11, and 9, respectively. For nonrespiratory-nondigestive diseases, however, it would be necessary to have t equal to 27 or to include only absences lasting 27 days or longer if the frequency rates for the two age groups are to be equal.

AVERAGE ANNUAL NUMBER OF DAYS OF DISABILITY PER MALE FROM ALL DISABILITIES CONTRIBUTING t DAYS OR LESS

Table 2 is derivable from the data presented in table 1. Instead of determining disability rates corresponding to absences of a specific length, say t days, the disability rate for a particular value of t is determined by the sum of all t days or less that can be possibly contributed by all absences. Thus the average annual number of days lost per male when t is 8 is determined by contributions in days from all disabilities, the size of each contribution being not more than 8 days. When t is 9 the disability rate is larger since the 9th day of disability is contributed by all disabilities lasting more than 8 days. It is evident that the disability rates when plotted against t can never be on a decreasing curve or on a straight line parallel to the t axis. If absences were of the same length the disability rates would lie on a straight line with an upward slope. Thus if there were 10 absences of the same length (greater than 8 days) each successive t would add 10 days to the number of days yielded by the t immediately preceding.

All ages.—Table 2 presents the pertinent data by broad cause group for all ages and for the two broad age groups. The days of disability do not include those arising from absences of less than 8 days' duration nor from absences which terminated in death before the eighth day of disability. The rates are somewhat higher than the rates found for males in the first paper of the series, the days of disability for the 4 cause groups of that experience being 3.894, 0.396, 1.114, and 2.384 when t is 364, while corresponding rates in the present instance are 4.250, 0.473, 1.189, and 2.588, respectively.

The greatest increase in time lost as t varies from 8 through 365 days is shown for the nonrespiratory-nondigestive group of diseases, the disability rate when t is 365 being exactly 6 times the rate when t is 8.

Disability rates by broad age group.—The pertinent data for the two broad age groups are shown graphically in figure 2. It will be observed that for each cause group the rates for the older workers are consistently higher than the corresponding rates for the younger workers. In this graphic presentation the horizontal axis may be considered an axis of maximum benefit periods,[4] the value of the rate for a given t

[4] The range of values is limited to those from 8 through 365.

TABLE 2.—*Annual number of days of disability per male, by broad age and cause groups, resulting from all disabilities contributing t days or less, experience of male employees of an oil refining company, absences lasting 8 calendar days or longer due to sickness and nonindustrial injuries, and ending during 1933–39, inclusive*

t days	All sickness and nonindustrial injuries			Nonindustrial injuries			Respiratory diseases			Digestive diseases			Nonrespiratory-nondigestive diseases [1]			t days
	All ages [2]	Under 50 years	50 years and over	All ages [2]	Under 50 years	50 years and over	All ages [2]	Under 50 years	50 years and over	All ages [2]	Under 50 years	50 years and over	All ages [2]	Under 50 years	50 years and over	
	Annual number of days of disability per male resulting from all disabilities contributing t days or less															
8	1.027	.934	1.335	.102	.097	.120	.460	.441	.522	.139	.133	.159	.326	.263	.534	8
9	1.143	1.038	1.489	.114	.108	.134	.509	.488	.580	.156	.149	.178	.364	.293	.597	9
10	1.250	1.133	1.632	.126	.119	.147	.553	.529	.632	.172	.164	.196	.399	.321	.657	10
11	1.347	1.220	1.765	.136	.129	.160	.591	.564	.678	.187	.179	.212	.433	.348	.715	11
12	1.436	1.298	1.889	.146	.138	.172	.623	.594	.719	.202	.193	.228	.465	.373	.770	12
13	1.518	1.370	2.003	.156	.148	.184	.651	.619	.754	.216	.207	.243	.495	.396	.822	13
14	1.593	1.435	2.112	.166	.156	.195	.675	.641	.787	.229	.220	.258	.523	.418	.872	14
15	1.660	1.492	2.213	.174	.164	.206	.695	.658	.816	.242	.233	.272	.549	.437	.919	15
16	1.723	1.545	2.308	.182	.172	.216	.712	.672	.841	.255	.245	.286	.574	.456	.965	16
17	1.783	1.596	2.400	.190	.179	.226	.728	.686	.866	.267	.257	.298	.598	.474	1.010	17
18	1.841	1.644	2.489	.198	.186	.236	.742	.698	.888	.279	.269	.311	.622	.491	1.054	18
19	1.896	1.689	2.573	.206	.193	.246	.755	.709	.909	.291	.280	.323	.644	.507	1.095	19
20	1.948	1.733	2.654	.213	.200	.255	.767	.718	.928	.303	.292	.335	.665	.523	1.136	20
21	1.998	1.775	2.732	.220	.206	.264	.779	.728	.946	.314	.303	.347	.685	.538	1.175	21
22	2.045	1.814	2.806	.227	.213	.272	.789	.736	.963	.324	.313	.359	.705	.552	1.212	22
23	2.091	1.851	2.878	.233	.218	.281	.798	.743	.979	.336	.324	.370	.724	.566	1.248	23
24	2.135	1.887	2.948	.240	.224	.289	.807	.750	.995	.346	.334	.381	.742	.579	1.283	24
25	2.177	1.922	3.016	.245	.229	.298	.816	.757	1.010	.356	.345	.391	.760	.591	1.317	25
26	2.219	1.956	3.092	.251	.234	.305	.824	.763	1.024	.367	.355	.402	.777	.604	1.351	26
27	2.259	1.989	3.147	.257	.240	.314	.831	.768	1.037	.377	.365	.412	.794	.616	1.384	27
28	2.298	2.021	3.208	.263	.245	.321	.838	.774	1.050	.387	.375	.422	.810	.627	1.415	28
35	2.534	2.210	3.598	.298	.276	.371	.878	.803	1.125	.448	.434	.487	.910	.697	1.615	35
42	2.724	2.360	3.921	.326	.301	.409	.907	.825	1.180	.496	.479	.543	.995	.755	1.789	42
49	2.874	2.473	4.193	.347	.319	.441	.931	.842	1.223	.527	.507	.585	1.069	.805	1.944	49
56	2.995	2.561	4.424	.365	.332	.471	.949	.856	1.256	.548	.528	.616	1.133	.847	2.081	56
63	3.094	2.630	4.620	.378	.342	.495	.964	.868	1.281	.564	.538	.640	1.188	.882	2.204	63
70	3.177	2.685	4.795	.388	.348	.516	.977	.878	1.303	.574	.546	.658	1.238	.913	2.318	70
77	3.249	2.733	4.950	.395	.353	.532	.989	.883	1.323	.582	.553	.671	1.283	.939	2.424	77
84	3.312	2.773	5.090	.401	.357	.544	1.000	.896	1.342	.588	.558	.681	1.323	.962	2.523	84
91	3.369	2.809	5.215	.406	.361	.554	1.009	.904	1.359	.594	.562	.689	1.360	.982	2.613	91
182	3.823	3.078	6.285	.447	.386	.648	1.095	.971	1.506	.623	.582	.746	1.658	1.139	3.385	182
273	4.073	3.211	6.926	.464	.393	.708	1.145	1.014	1.582	.630	.587	.761	1.834	1.217	3.885	273
364	4.248	3.303	7.377	.473	.396	.721	1.188	1.050	1.646	.632	.588	.769	1.955	1.269	4.238	364
365	4.250	3.304	7.380	.473	.396	.724	1.189	1.051	1.646	.632	.588	.769	1.956	1.269	4.241	365

Number of days of disability resulting from all disabilities contributing *t* days or less

8	69,600	48,640	20,896	6,920	5,072	1,880	31,176	22,992	8,168	9,440	6,928	2,488	22,064	13,688	8,360	8
9	77,444	54,077	23,296	7,724	5,618	2,097	34,52[illegible]	25,436	9,073	10,569	7,758	2,784	24,624	15,265	9,342	9
10	84,658	59,039	25,541	8,494	6,178	2,306	37,461	27,557	9,884	11,653	8,561	3,032	27,050	16,743	10,289	10
11	91,252	63,547	27,620	9,221	6,705	2,505	40,008	29,384	10,602	12,690	9,333	3,324	29,333	18,125	11,189	11
12	97,280	67,633	29,555	9,919	7,210	2,607	42,193	30,926	11,243	13,680	10,071	3,573	31,488	19,426	12,043	12
13	102,805	71,356	31,350	10,588	7,696	2,879	44,084	32,252	11,806	14,623	10,775	3,809	33,510	20,633	12,856	13
14	107,917	74,753	33,053	11,220	8,149	3,057	45,732	33,387	12,317	15,540	11,460	4,038	35,425	21,762	13,641	14
15	112,464	77,722	34,629	11,797	8,557	3,225	47,053	34,259	12,764	16,417	12,116	4,256	37,197	22,790	14,384	15
16	116,730	80,491	36,119	12,356	8,954	3,386	48,223	35,026	13,165	17,271	12,757	4,466	38,880	23,754	15,102	16
17	120,822	83,132	37,563	12,898	9,338	3,543	49,313	35,720	13,550	18,104	13,384	4,669	40,507	24,681	15,801	17
18	124,714	85,635	38,945	13,422	9,708	3,698	50,287	36,351	13,900	18,918	13,999	4,865	42,087	25,577	16,484	18
19	128,423	88,013	40,269	13,934	10,070	3,845	51,179	36,918	14,223	19,717	14,601	5,059	43,593	26,424	17,142	19
20	131,969	90,288	41,534	14,429	10,420	3,989	51,998	37,434	14,525	20,501	15,192	5,249	45,041	27,242	17,771	20
21	135,376	92,470	42,754	14,911	10,760	4,130	52,761	37,913	14,809	21,266	15,769	5,434	46,438	28,028	18,381	21
22	138,563	94,489	43,917	15,363	11,075	4,266	53,443	38,329	15,076	22,005	16,327	5,612	47,752	28,759	18,963	22
23	141,629	96,434	45,033	15,797	11,375	4,399	54,090	38,716	15,325	22,730	16,876	5,785	49,022	29,467	19,524	23
24	144,615	98,321	46,127	16,220	11,667	4,529	54,688	39,083	15,566	23,448	17,421	5,955	50,259	30,150	20,077	24
25	147,517	100,150	47,196	16,634	11,953	4,656	55,262	39,424	15,799	24,155	17,957	6,124	51,466	30,816	20,617	25
26	150,329	101,920	48,234	17,039	12,231	4,782	55,807	39,744	16,024	24,850	18,484	6,290	52,633	31,461	21,138	26
27	153,040	103,621	49,240	17,432	12,498	4,907	56,314	40,042	16,233	25,530	19,000	6,452	53,764	32,081	21,648	27
28	155,652	105,266	50,203	17,818	12,761	5,029	56,784	40,316	16,429	26,192	19,505	6,607	54,858	32,684	22,138	28
35	171,673	115,153	56,312	20,207	14,373	5,802	59,485	41,845	17,601	30,334	22,608	7,632	61,647	36,327	25,277	35
42	184,518	122,937	61,359	22,093	15,655	6,406	61,458	42,962	18,457	33,584	24,977	8,499	67,383	39,343	27,997	42
49	194,692	128,846	65,610	23,548	16,608	6,908	63,050	43,874	19,137	35,687	26,413	9,152	72,407	41,951	30,413	49
56	202,898	133,418	69,230	24,704	17,307	7,365	64,287	44,593	19,655	37,155	27,384	9,635	76,752	44,134	32,575	56
63	209,585	137,023	72,302	25,577	17,790	7,746	65,301	45,211	20,051	38,200	28,046	10,008	80,507	45,967	34,497	63
70	215,204	139,903	75,034	26,243	18,140	8,071	66,188	45,754	20,395	38,911	28,465	10,298	83,862	47,544	36,275	70
77	220,107	142,378	77,455	26,745	18,396	8,317	67,002	46,253	20,710	39,453	28,800	10,493	86,907	48,929	37,935	77
84	224,402	144,475	79,646	27,157	18,617	8,508	67,731	46,692	21,000	39,869	29,051	10,651	89,645	50,115	39,487	84
91	228,238	146,339	81,617	27,517	18,813	8,672	68,384	47,082	21,263	40,217	29,265	10,784	92,120	51,179	40,898	91
182	258,987	160,357	98,348	30,268	20,102	10,134	74,200	50,587	23,574	42,176	30,331	11,677	112,343	59,337	52,963	182
273	275,924	167,254	108,388	31,415	20,465	10,918	77,614	52,811	24,761	42,666	30,584	11,914	124,229	63,391	60,795	273
364	287,784	172,067	115,435	32,000	20,643	11,325	80,503	54,710	25,754	42,815	30,611	12,036	132,466	66,103	66,320	364
365	287,885	172,110	115,493	32,003	20,644	11,327	80,531	54,728	25,764	42,816	30,611	12,037	132,535	66,127	66,365	365

[1] Includes a negligible number of absences of ill-defined or unknown diagnosis.

[2] Includes a negligible number of absences of unknown age.

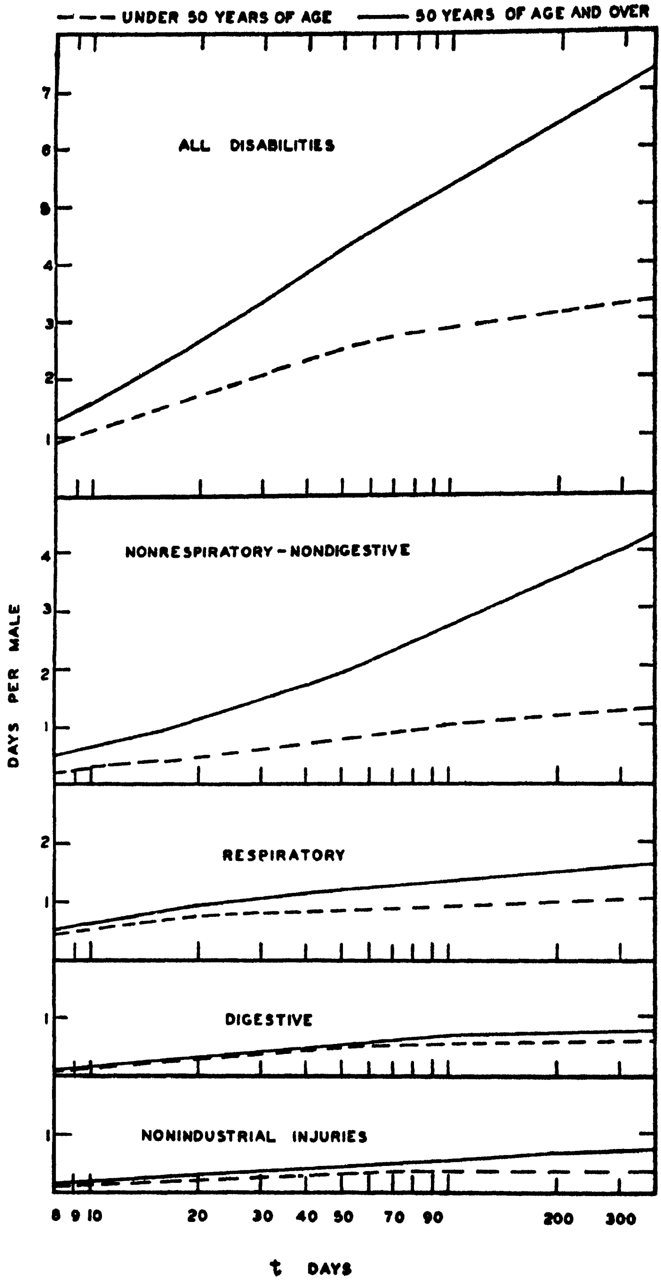

FIGURE 2.—Annual number of days of disability per male resulting from all disabilities contributing t days or less, for ages under 50 years and 50 years and over, experience of male employees of an oil refining company, absences lasting 8 calendar days or longer due to sickness and nonindustrial injuries and ending during 1933–39, inclusive. (Logarithmic horizontal scale.)

being the average annual number of days lost per male for a maximum benefit period equal to t. Thus for the oil refinery workers where the maximum benefit period was 365 days, the days lost per male on account of all sickness and nonindustrial injuries is 3.304 for the younger group, and 7.380 for the older group.

The most marked difference in the rates with respect to age is shown by the nonrespiratory-nondigestive group of diseases, both age groups showing initial rates of less than 1, and terminal rates greater than 1 and greater than 4, for the younger and older groups, respectively.

A pertinent question with respect to the age factor is: What maximum benefit period (or value of t) for the older workers yields a disability rate approximately equal to the rate for the younger group with a maximum benefit period of 365 days. This particular disability rate is 3.3 days per male, a rate which corresponds among the older males to a t of about 4 weeks. Thus, if all absences among the older group were arbitrarily terminated at 4 weeks the resulting recorded disability rate would be equal to the rate experienced by the younger group whose absences were terminated at 365 days. In other words, the older group had accumulated during the first 4 weeks of disability a sufficient number of days of disability to yield a rate equal to that for the younger group based on a year's accumulation.

RATIO OF RATES

The disability record of the older worker becomes more meaningful when it is expressed in terms of the experience of the younger group. For this reason appropriately selected ratios of the frequency and the disability rates are shown in table 3.

Ratio of the frequency rates.—Interest centers on the behavior of the ratio for the nonrespiratory-nondigestive group of diseases, the ratio increasing gradually from a value of approximately 2 to one of over 6. Thus while the older group shows a frequency of 8-day or longer disabilities approximately twice the corresponding frequency for the younger group, the frequency of disabilities lasting 273 days or longer among the older group is over 6 times the corresponding frequency for the younger group. While the initial value of the ratio for all sickness and nonindustrial injuries is lower than the initial value for the nonrespiratory-nondigestive group of diseases, the ratios move upward more or less parallel to each other as t increases in value, that is, as the disabilities of shorter duration drop out. Thus not only are the 8-day or longer frequencies in excess among the older group but when duration is taken into account the excess becomes more and more evident as duration increases.

Ratio of the disability rates.—The ratio of the disability rates for selected values of t will also be found in table 3. The nonrespiratory-nondigestive group of diseases is again of principal interest, the ratio

gradually increasing from approximately 2 to over 3. Thus the ability of the absences to continue to contribute to the disability rate becomes less and less among the younger group when compared to the older one. With regard to the other three cause groups the initial value of the ratio is more than one, and in each instance there is a tendency for the ratio to increase as *t* increases.

TABLE 3.—*Ratio of frequency and disability rates for ages 50 years and over to corresponding rates for ages under 50 years by broad cause group, experience of male employees of an oil refining company, absences lasting 8 calendar days or longer and ending during 1933–39, inclusive*

[Derived from tables 1 and 2]

t days	Ratio of rate for ages 50 years and over to rate for ages under 50 years									
	Rate Annual number of absences per 1,000 males disabling for *t* days or more					Rate Annual number of days of disability per male resulting from all disabilities contributing *t* days or less				
	All sickness and nonindustrial injuries	Nonindustrial injuries	Respiratory diseases	Digestive diseases	Nonrespiratory-nondigestive diseases	All sickness and nonindustrial injuries	Nonindustrial injuries	Respiratory diseases	Digestive diseases	Nonrespiratory-nondigestive diseases
8	1.43	1.24	1.18	1.20	2.03	1.43	1.24	1.18	1.20	2.03
14	1.67	1.31	1.50	1.11	2.31	1.47	1.25	1.23	1.17	2.09
21	1.86	1.38	1.98	1.06	2.58	1.54	1.28	1.30	1.15	2.18
28	1.95	1.56	2.36	1.02	2.70	1.59	1.31	1.36	1.13	2.26
35	2.12	1.61	2.58	1.17	2.97	1.63	1.34	1.40	1.12	2.32
42	2.23	1.65	2.50	1.31	3.03	1.66	1.36	1.43	1.13	2.37
49	2.47	1.83	2.55	1.58	3.10	1.70	1.38	1.45	1.15	2.41
56	2.76	2.41	2.28	1.74	3.45	1.73	1.42	1.47	1.17	2.46
63	3.01	2.58	2.12	2.21	3.67	1.76	1.45	1.48	1.19	2.50
70	3.24	3.50	2.14	2.09	3.88	1.79	1.48	1.48	1.21	2.54
77	3.37	3.33	2.23	1.88	4.11	1.81	1.51	1.49	1.21	2.58
84	3.52	2.83	2.27	2.17	4.35	1.84	1.52	1.50	1.22	2.62
91	3.59	3.00	2.30	2.00	4.50	1.86	1.53	1.50	1.23	2.66
182	4.20	8.00	1.57	2.00	5.73	2.04	1.68	1.55	1.28	2.97
273	5.00	4.00	1.75	-	6.86	2.16	1.78	1.56	1.30	3.10
365	4.62	--	2.00	--	5.80	2.23	1.83	1.57	1.31	3.34

SUMMARY

This paper, the third of a series on the duration of disabling sickness and nonindustrial injuries, based on absences lasting 8 calendar days or longer, reported periodically by an oil refining company over a period of 7 years, presents principally two basic tables showing industrial morbidity among males by broad age and cause groups. One table gives the average annual number of absences per 1,000 males causing disability for a specified number of days, *t* or more, and the other, the average annual number of days of disability per male resulting from all disabilities contributing *t* days or less, the *t* in both instances varying from 8 through 365 days. For each cause group and each value of *t*, the frequency and the disability rates for the group of males 50 years of age and over were higher than the corresponding rates for the group under 50 years of age.

In general, the ratios of the rates, both frequency and disability, for the older age group to the corresponding rates for the younger group increased as t increased; for the nonrespiratory-nondigestive disease group, all of the ratios were greater than 2.

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THE INCIDENCE OF CANCER IN DALLAS AND FORT WORTH, TEXAS, AND SURROUNDING COUNTIES, 1938[1]

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This paper is the sixth in a series of studies of the prevalence and incidence of cancer in the United States. The information was obtained by reports from doctors and hospitals in 10 areas and concerns all cases seen (whether treated or merely observed) during the study year, 1938 in this case. The findings of the first five of these surveys have been published;[2] the first paper gives a more detailed description of the procedure used in collecting the data.

The sixth area surveyed consisted of two adjacent counties, Dallas

[1] From the Division of Public Health Methods, National Institute of Health

[2] Preceding papers are

(1) Mountin, Joseph W , Dorn, Harold F , and Boone, Bert R. The incidence of cancer in Atlanta, Ga., and surrounding counties Pub Health Rep , 54 1255–1273 (1939).

(2) Dorn, Harold F The incidence of cancer in Cook County, Ill Pub Health Rep , 55 628–650 (1940).

(3) McDowell, Arthur J The incidence of cancer in Pittsburgh and Allegheny County, Pa , 1937. Pub. Health Rep , 55 1419–1451 (1940)

(4) McDowell, Arthur J The incidence of cancer in Detroit and Wayne County, Mich., 1937. Pub. Health Rep , 56 703–739 (1941).

(5) McDowell, Arthur J.. The incidence of cancer in New Orleans, La , 1937. Pub Health Rep., 56 1141–1170 (1941).

and Tarrant, in Texas,[3] which include the cities of Dallas and Fort Worth and have a total combined population of over 600,000.[4] Reports were secured from all but 8 of the 705 doctors, and one of the 55 hospitals and allied institutions, a small home which, it is thought, could have had very few, if any, cases of cancer.

The data were collected separately in Dallas and Tarrant Counties and, although they were ultimately combined, preliminary tabulations were made for each county. The doctors and hospitals of Tarrant County reported a total of 1,091 cancer cases; in addition 11 deaths from cancer that were not included in the reported cases were obtained from the death certificate records filed with the Board of Health. Reports from Dallas County included 2,592 cases of cancer; 10 additional cancer deaths were not reported as cases.

The ratio of resident cases to deaths is sometimes used in making comparisons of cancer prevalence, but, as pointed out in an earlier paper (paper *3*, footnote 2), is liable to misinterpretation. This ratio was found to be 5.1 in Dallas County and 4.2 in Tarrant County. Both of these ratios are higher than those for any of the areas surveyed earlier, except Atlanta, Ga., where the ratio was 5.3 (table 1).

TABLE 1.—*Number of reported cases of cancer and the ratio of resident cases to resident deaths by sex and color, Dallas and Tarrant Counties, Tex., 1938*

	Dallas County					Tarrant County				
	Total			White	Colored	Total			White	Colored
	Both sexes	Male	Female			Both sexes	Male	Female		
Reported cases	2,592	1,278	1,314	2,434	158	1,091	527	564	1,061	30
Deaths not reported as a case	*10*	*4*	*6*	*10*		*11*	*5*	*6*	*8*	*3*
Total resident cases[1]	[illegible]	699	884	1,436	147	798	361	437	767	31
Resident death certificates	*313*	[illegible]	*179*	*267*	*46*	*192*	*83*	*109*	*184*	*8*
Ratio (resident cases per resident death)	5.1	5.2	4.9	5.4	3.2	4.2	4.4	4.0	4.2	3.9

[1] Includes resident cases from death certificate only.

Although the ratio of cases to deaths is higher in Dallas than in Tarrant County, this does not mean that cancer is more common in Dallas County. The number of cases of cancer per 100,000 population is 412 in Dallas and 363 in Tarrant County, a difference of 13.4 percent. But this rate is based upon all cases reported and consequently is influenced by the completeness with which cases diagnosed prior to the study year are reported. If the rate is based upon new cases, that is, those diagnosed during the study year, the rates for the white population are 274 in Dallas and 265 in Tarrant County, a

[3] The field work of collecting the data in this area was under the supervision of Bernard A. Koteen. The tabulation of the data was under the supervision of Miss Bess Cheney. Assistance in the preparation of these materials was furnished by the personnel of Work Projects Administration Official Project No. 65-2-23-366. The entire survey was directed by Harold F. Dorn.

[4] Using the preliminary count of the 1940 Census for the two counties, the population was estimated to have been 606,068 on July 1, 1938.

difference of only 3.6 percent. Since there apparently is no real difference in the incidence of cancer in the two counties, the reports have been combined and the entire area will be treated as a unit.

The prevalence rate for resident cases in the two counties combined is 394 per 100,000 population. This crude prevalence rate is higher than that for any of the areas previously reported except New Orleans, where the rate was 427. The rates in other cities were: Atlanta 390, Chicago 345, Pittsburgh 332, and Detroit 283.

NUMBER OF CASES REPORTED PER DOCTOR OR HOSPITAL

Over one-half of the doctors and nearly one-half of the institutions reported having had no cases of cancer during the study year. Many of the doctors who had seen no cases were specialists in fields in which cancer is relatively infrequent, pediatrics, psychiatry, obstetrics, etc., and the institutions reporting no cases were small homes or sanatoriums devoted to some particular field (nursing homes, tuberculosis sanatoriums, etc.). However, it is generally true that the average practitioner sees relatively few cases of cancer, and that most of the cases are cared for by a relatively small number of physicians. In this area 89 percent of the doctors had only 21.4 percent of all the cases reported by doctors. Only 3.1 percent of the doctors reported over 20 cases of cancer each, but these accounted for 59 percent of all doctors' cases. Among the hospitals, less than 30 percent reported over 20 cases each but these institutions accounted for over 97 percent of all the cases reported by hospitals (table 2).

TABLE 2.—*Percentage distribution of reporting sources by number of cancer cases reported by each, with the corresponding percentage distribution of cases, Dallas and Fort Worth, Tex., 1938*

Number of cases reported by each source	Percentage distribution of—					
	Doctors'		Hospitals'		Total	
	Reports	Cases	Reports	Cases	Reports	Cases
No cases	51.1	0	44.4	0	50.5	0
1 or more cases	48.9	100	55.6	100	49.5	100
1 case	*15.2*	*3.8*	*9.3*	*0.2*	*14.7*	*2.1*
2 to 5 cases	*22.7*	*17.6*	*11.1*	*0.8*	*21.8*	*9.6*
6 to 10 cases	*5.6*	*10.8*	*3.7*	*0.7*	*5.4*	*6.0*
11 to 20 cases	*2.3*	*8.8*	*1.9*	*0.7*	*2.3*	*4.9*
Over 20 cases	*3.1*	*59.0*	*29.6*	*97.6*	*5.3*	*77.4*
Total	100.0	100.0	100.0	100.0	100.0	100.0

FREQUENCY OF MICROSCOPIC CONFIRMATION OF DIAGNOSES

The ultimate decision as to whether a particular case should be included as a malignant growth was made by the doctor who had treated the case. If the reporting doctor had diagnosed a case as cancer, it was included in the survey even though that diagnosis had

been made only clinically. There had been a microscopic test made to confirm the diagnosis for only half (49.8 percent) of the cases reported in Dallas and Fort Worth. This is lower than the similar percentage for any of the other areas, although it is not very different from the figures for the other two southern cities already surveyed. Atlanta with 52 percent, New Orleans with 51.7 percent, and this area with 49.8 percent, have each reported a much lower percentage of cases with a microscopic diagnosis than have the three northern areas (Chicago 70 percent, Pittsburgh 62 percent, and Detroit 78 percent). One of the reasons for this is that the southern cities have many more cases of cancer of the skin, and malignant growths primary in this site are less often biopsied (table 3).

TABLE 3.—*Percentage of cancer cases with a microscopic diagnosis, by primary site and reporting source, Dallas and Fort Worth, Tex., 1938*

Primary site	Percentage of microscopic examinations in cases reported by		
	Doctors only	Hospitals [1]	All sources
Buccal cavity	23 6	52 5	36 3
Digestive tract	46 0	55 2	51 3
Respiratory system	60 9	60 4	60 6
Genito-urinary system	74 2	78 1	76 8
Breast	74 1	70 2	71 6
Skin	15 9	40 2	24 1
All other sites [2]	72 1	70 0	70 9
All sites	37.4	61 6	49 8

[1] This includes cases reported by a hospital and a doctor, as well as cases reported by hospitals only
[2] There were too few cases primary in the brain and bones for separate listing here and these are included with "all other sites"

The smallness of the percentage of microscopic examinations among skin and buccal cavity cancers suggests that the high prevalence of these cases in this area might alone account for the low percentage of microscopic diagnoses for all cases. When this percentage is calculated for all cases *except* skin and buccal cavity for various cities, it is apparent that this is so. The figures are as follows: Dallas and Fort Worth 68.2 percent, New Orleans 54.5 percent, Pittsburgh 63.6 percent, Detroit 77.7 percent. Except for cancer of the skin and buccal cavity, therefore, this area is not low in the percentage of microscopic diagnoses. It is because there are relatively more skin cancers, and because only an exceptionally small number of them were biopsied, that the percentage of microscopic examinations is lower in this area than in any of those previously reported.

SITE DISTRIBUTION OF CANCER CASES

Table 4 lists separately by sex the percentage distribution of cases by primary site. Cases with primary site unknown are included in the last group, "all other sites"

Table 4.—*Percentage distribution of all cases of cancer by primary site and by sex, Dallas and Fort Worth, Tex., 1938*

Primary site	Percentage in each group		Primary site	Percentage in each group	
	Male	Female		Male	Female
Buccal cavity	18 4	4 2	Genito-urinary system	11 5	33 7
Lip	*13 6*	*1 7*	*Uterus*	--- -	*26 6*
Others	*4 8*	*2 5*	*Prostate*	*6 0*	---- -
Digestive tract	14 5	12 7	*Kidneys, bladder*	*4 1*	*1.6*
Stomach, duodenum	*4 7*	*2 9*	*Others*	*1 4*	*5 5*
Intestines	*3 3*	*3 5*	Breast	1	22 2
Rectum, anus	*3 0*	*3 0*	Skin	46 5	21 7
Others	*3 5*	*3 3*	Brain	1 1	.9
			Bones	1 4	6
Respiratory system	3 1	.8	All other sites	3 4	3 2
Lungs, pleura	*1 5*	*.3*			
Others	*1 6*	*.5*	All sites	100 0	100 0

Skin cancer makes up one-third of all the cases reported in this area. It constitutes a much larger portion (46.5 percent) of the cases among males than among females (21.7 percent), and occurs almost exclusively among white persons. For white residents the prevalence rate of skin cancer in this area is 140 per 100,000 population, a rate higher than that for any of the areas previously reported. Figure 1 shows the prevalence rate of skin cancer for each of the study areas analyzed so far.

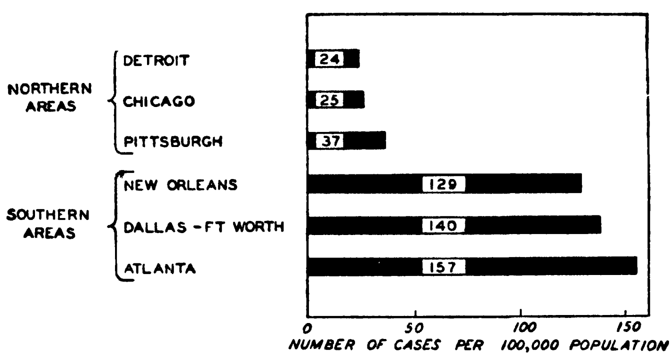

Figure 1.—Number of cases of skin cancer per 100,000 population in 6 urban areas.

There is a remarkable difference in the prevalence of lip cancer among males and among females, not only in this area but in each of the others investigated. In Dallas and Fort Worth, although the total number of cancer cases is divided almost equally between males and females, lip cancer makes up only 1.7 percent of the total cases among females as compared with 13.6 percent among males. The actual figures show that there were 245 cases of lip cancer among males and only 32 cases among females. Since there is no reason to suppose any great preponderance of males over females in the population of this area, cancer of the lip is seen to be 7 or 8 times as frequent among males as among females. The data collected do not permit further

examination into factors that might throw some light on this particular relationship of sex and site.

The other sex differences in the primary site of the malignant growths are similar to those observed in the earlier studies in this series. Cancer of the respiratory system as well as of the skin and buccal cavity is much more prevalent among males than among females. Nearly one-half (48.8 percent) of the cases among females were listed as cancer of the breast or of the uterus. Thus the most frequent sites of cancer among males are skin, buccal cavity, digestive tract, and genito-urinary system, while among females the order is genito-urinary system (over three-fourths of which are uterus), breast, skin, and digestive tract.

AGE DISTRIBUTION OF REPORTED CANCER CASES

The percentage distribution by age of the 3,082 cancer cases by sex is very like the age distributions found in the cities previously surveyed. Ninety-one percent of all the cases are between the ages of 30 and 79; 67.5 percent of all cases are between the ages of 40 and 69. There are 48 cases of cancer in the age groups under 20 and 153 cases under 30 years of age.

Differences in age distribution between cases among males and females and white and colored persons were found here as in the other cities surveyed. There are relatively more cases among males than females under 25 years of age. Seventy-four percent of the cases among females are found in the age groups between 25 and 64, but slightly less than 60 percent of the male patients are between these ages. The colored cases tend to be younger than the white cases. Seventy-six percent of the colored cases are in age groups below 65, while only 55.7 percent of the white cases are in these groups.

RELATIONSHIP BETWEEN PRIMARY SITE AND AGE

More than three-fourths of the cases of cancer primary in the prostate are in the age group 65 and over, while only 37.7 percent of all cases among males are in that age group (table 5). Seventy-four percent of the cancers of the female genito-urinary system are found among persons from 35 to 64 years of age (table 6). Cancer of the skin is found in appreciable numbers in every age group above 35 years, but the prevalence of cancer of this site is directly associated with age and its relative importance increases regularly with age. Malignant growths primary in the buccal cavity (except for lip), digestive tract, and respiratory system are found chiefly at ages above 35. Breast cancers occur most frequently among females in the age groups from 35 to 64, nearly three-fourths (73.7 percent) of the cases being at those ages. The only sites that appear most frequently among relatively young people are brain, bones, lip, and the group

"all other sites." [5] For these site groups more than one-third of the cases are under 45, and over one-half are under 55 years of age.

TABLE 5.—*Percentage distribution by age and primary site of male cancer cases reported, Dallas and Fort Worth, Tex., 1938*

Primary site	Age of patient									Number of cases [1]
	Under 15	15–24	25–34	35–44	45–54	55–64	65–74	75 and over	All ages	
Buccal cavity	---	2.3	8.6	17.6	22.2	22.2	20.3	6.8	100	266
Lip	---	*3.2*	*11.0*	*21.6*	*27.3*	*20.0*	*13.2*	*3.7*	*100*	*190*
Others			*2.6*	*7.9*	*9.2*	*27.6*	*38.2*	*14.5*	*100*	*76*
Digestive tract	0.4	.4	4.2	10.8	20.4	27.5	26.3	10.0	100	210
Stomach and duodenum			*2.5*	*10.0*	*16.2*	*27.5*	*30.0*	*13.8*	*100*	*80*
Others	*.6*	*.6*	*5.0*	*11.3*	*22.5*	*27.5*	*24.4*	*8.1*	*100*	*160*
Respiratory system	2.1	6.2	2.1	14.6	22.9	25.0	20.8	6.3	100	48
Genito-urinary system	2.1	.5	5.2	7.2	7.8	17.1	44.0	16.1	100	193
Prostate				*1.0*	*3.0*	*16.2*	*57.6*	*22.2*	*100*	*99*
Others	*4.2*	*1.1*	*10.6*	*13.8*	*12.8*	*18.1*	*29.8*	*9.6*	*100*	[illegible]
Skin		.6	3.5	10.0	21.5	25.3	24.3	14.8	100	622
All other sites [2]	12.0	12.0	9.0	7.0	13.0	25.0	19.0	3.0	100	100
All sites	1.2	1.8	5.1	11.1	19.1	24.0	26.0	11.7	100	1,469

[1] Cases of unknown age, 336 in all, are excluded here.
[2] Breast, brain, and bones are included with "all other sites" in this table, there being too few cases to permit separate listing.

TABLE 6.—*Percentage distribution by age and primary site of female cancer cases, Dallas and Fort Worth, Tex., 1938*

Primary site	Age of patient									Number of cases [1]
	Under 15	15–24	25–34	35–44	45–54	55–64	65–74	75 and over	All ages	
Buccal cavity				24.6	16.4	32.8	18.0	8.2	100	61
Digestive tract		1.4	6.8	10.5	21.0	30.6	24.2	5.5	100	219
Genitourinary system	0.2	.4	7.9	20.7	30.1	23.2	[illegible]	[illegible]	100	[illegible]
Uterus		*.2*	*7.4*	*21.9*	[illegible]	[illegible]	[illegible]	[illegible]	*100*	[illegible]
Others	*.8*	*.8*	[illegible]	*16.2*	*25.2*	*24.4*	*17.1*	[illegible]	*100*	[illegible]
Breast			7.3	26.3	30.6	22.8	11.9	7.1	100	369
Skin	.4	1.1	7.3	9.0	17.1	23.7	21.1	[illegible]	100	[illegible]
All other sites [2]	[illegible]	5.2	9.4	12.5	[illegible]	18.8	[illegible]	[illegible]	100	[illegible]
All sites	.7	.8	7.3	17.1	25.9	24.3	17.2	6.7	100	1,613

[1] Cases of unknown age, 265 in all, are excluded from this table.
[2] Respiratory system, brain, and bones had too few cases to be listed separately, and are here included with "all other sites." The actual numbers are listed in appendix table 6.

DURATION OF REPORTED CASES OF CANCER

Information was collected also on the duration of the cancer cases. This refers to the actual known duration after the case had been diagnosed as cancer by a physician, and is the period from the date the doctor so diagnosed the case to the end of the study year or, if the patient died during the year, to the date of death. Forty-two percent of all the cases had a duration of less than 6 months, but there were 90 cases, 2.6 percent, that had a duration of at least 8 years, and 118 with a duration of from 5 to 8 years. The white cases

[5] This group includes eye, certain glands, as well as a large group of ill defined sites or cases where the primary site was unknown.

had a longer average duration than the colored cases; 67.4 percent of the white cases, and 87.7 percent of the colored cases had a duration of less than 1 year.

There are wide differences in the duration of cancer of the various primary sites. Malignant growths primary in the respiratory system, digestive tract, brain, and bones had the shortest duration. Over half of the cases in each of these sites were of less than 6 months' duration. However, 70 percent of the cases of breast cancer had longer than 6 months' duration and 48 percent had longer than 1 year's duration. Cancer of the skin, buccal cavity, and uterus likewise had a longer than average duration.

TABLE 7.—*Percentage distribution of all reported cancer cases of known vital status by primary site and duration since first diagnosed, Dallas and Fort Worth, Tex., 1938*

Primary site	Months since first diagnosis								
	Less than 6	6–11	12–23	24–35	36–47	48–59	60 and over	96 and over	Total
Buccal cavity	38.9	29.9	13.6	5.2	2.0	2.6	7.8	*4.1*	100
Lip	*37.2*	*31.0*	*14.6*	*4.2*	*2.1*	*2.5*	*8.4*	*4.2*	*100*
Others	*42.5*	*27.4*	*11.3*	*7.5*	*1.9*	*2.8*	*6.6*	*3.8*	*100*
Digestive tract	57.6	20.1	12.8	3.6	.7	1.8	3.4	*1.4*	100
Stomach and intestines	*60.8*	*18.5*	*12.5*	*2.6*	*.4*	*.9*	*4.3*	*2.2*	*100*
Rectum and anus	*45.8*	*18.1*	*19.1*	*5.3*	*2.1*	*6.4*	*3.2*	-----	*100*
Others	*61.0*	*24.8*	*8.0*	*4.4*	----	----	*1.8*	*.9*	*100*
Respiratory system	63.2	19.3	14.0	1.8			1.7	*1.7*	100
Genito-urinary system	42.9	25.5	16.4	6.4	2.4	2.7	8.7	*1.4*	100
Uterus	*37.7*	*25.8*	*18.3*	*7.3*	*2.2*	*3.6*	*5.1*	*1.9*	*100*
Prostate	*55.2*	*23.9*	*16.7*	*4.2*	---	--	----	----	*100*
Kidneys and bladder	*49.0*	*16.7*	*16.7*	*5.2*	*5.2*	*3.1*	*4.1*	*2.1*	*100*
Others	*46.6*	*34.0*	*8.7*	*5.8*	*2.9*	*1.0*	*1.0*	---	*100*
Breast	29.9	21.7	21.6	9.3	6.6	3.8	7.1	*3.0*	100
Skin	37.5	28.2	16.1	5.8	3.7	1.4	7.3	*3.5*	100
All other sites [1]	52.9	19.4	16.8	4.5	2.6	.6	3.2	*.6*	100
All sites	42.0	25.3	16.1	5.8	3.0	2.1	5.7	*2.6*	100

[1] Included here with "all other sites" are 32 cases primary in the brain and 27 primary in the bones.

DIFFERENCES IN FATALITY AMONG CANCER OF VARIOUS SITES

Table 8 shows the percentage of cases of each site group that die within 1 year from the date they are first diagnosed as cancer. This percentage could be obtained directly only by observing a particular group of cases through the first year following diagnosis and determining the number of survivors. Since the survey was made of all the cases seen during one particular calendar year, the cases first seen during the study year would not have completed a year's duration, while the cases which had completed a year's duration would be only a part of the original group first seen sometime during the preceding year. Therefore, in order to compute this measure of relative fatality it was necessary to resort to an indirect method based only on the reasonable assumption that both the incidence rate and the mortality rate of cancer remain constant in two successive years. Granted this assumption, a percentage can be obtained based upon the cases first

seen in the study year and the cases dying in that year with a duration of less than 1 year. This is analogous to the computation of infant mortality using the births in one year and the deaths in that same year of infants aged under 1 year.

TABLE 8.—*Percentage of cancer cases dying within 1 year of the date first diagnosed as cancer, Dallas and Fort Worth, Tex., 1938*

Primary site	Number of cases		Percentage dying within 1 year from date first seen
	Dying in the study year and having less than 1 year's duration [1]	First seen in the study year	
Buccal cavity	28	283	9 9
Digestive tract	216	363	59 5
Respiratory system	22	56	39 3
Genito-urinary system	160	551	29 0
Breast	47	205	22 9
Skin	23	816	2 8
Brain	19	32	59 4
Bones	8	27	29 6
All other sites	34	77	44 2
All sites	557	2,410	23 1

[1] Based on all cases reported by the doctor or hospital as dead

Of all cases of cancer, 23 percent died within 1 year of the date they were first diagnosed as malignant. It is probable that this percentage is a slight understatement because it is based on all reported cases first seen in the study year and all cases dying in the study year with less than a year's duration regardless of residence. Inclusion of nonresident cases probably lowers this index since some nonresident deaths would have occurred at the place of residence and the reporting physician may not have been aware of the death. This should have only a slight effect, however, and should scarcely affect the validity of comparisons of relative fatality among the various sites.

The sites in which cancer showed the highest relative fatality were digestive tract, brain, respiratory system, and "all other sites." About 60 percent of the cancers of the digestive tract and brain resulted in death within 1 year from the date first seen while the figures for cancer of the respiratory system and "all other sites" were 39.3 and 49.2 percent, respectively. Skin cancer, at the other extreme, resulted in death within a year in only 2.8 percent of the cases, and buccal cavity cancer in only 10 percent of the cases. Malignant growths primary in the breast and in the genito-urinary system occupy a position between these extremes with genito-urinary somewhat more fatal than breast cancer. However, when cancer of the uterus is considered apart from that of the other genito-urinary system sites, its fatality is found to be slightly less than that of breast cancer (21.3 percent for cancer of the uterus).

CASES OF CANCER IN THE GROUP UNDER OBSERVATION ONLY

It has been observed already that two classes of cancer cases were included in this survey: cases actually treated for present malignant growth during the study year, and cases that had been previously diagnosed and treated as malignant but had been "cured" and were under observation to guard against the possibility of a recurrence of the growth. It is worthwhile to examine this latter group separately, for while it is true that only a fraction of the cases of cancer was followed [6] subsequent to successful treatment, and further that even those that were followed were reported less completely than were treated cases, nevertheless, an appreciable number of such cases were reported and they are cases which have been observed, without a recurrence of the cancer, for at least 1 year. These cases, hereafter called the "observed-only" cases, constitute 10.6 percent of all cases reported, 389 in number. There were relatively more cases among females than males in this group and more white than colored cases. Most of the observed-only cases were reported by doctors rather than by hospitals; 18 percent of all the doctors' cases being in this class while only 4 percent of the hospital cases were under observation only.

TABLE 9.—*Percentage of reported cases of cancer that were under observation only, by sex, color, and reporting source, Dallas and Fort Worth, Tex., 1938*

Class of case	Percentage of cases in each class							
	Male	Female	White	Colored	Cases reported by— Doctor	Hospital	Both	All cases
Observed only	9 9	11 2	10 9	4 8	18 0	4 2	0 9	10 6
Treated in 1938	90 1	88 8	89 1	95 2	82 0	95 8	99 1	89 4
All cases	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0

The problem of duration of the observed-only cases is interesting insofar as it concerns the length of time the cases have been under observation without showing any signs of recurrence of cancer. Consequently, a different sort of duration from that considered earlier has been used, the duration since the last date of treatment for malignant growth. This has been figured as the time from the date of last treatment up to the beginning of the study year so that each

[6] An estimate of the deficiency in follow up observation of cancer cases can be made as follows The number of cases first seen in 1938 and alive at the end of the study year was 1,565 If it is assumed that the same number originated in 1937 and that the same number were alive at the end of 1937 and so eligible for observation or treatment in 1938, this figure 1,565, can be compared with the number of cases seen in 1938 which originated in 1937 according to their recorded duration Thus a percentage can be obtained which represents the portion of those cases alive at the end of the year that were actually followed into the next year. This percentage is only 49, which means that less than half of the cases originating during a particular year and living through that year are followed long enough to have been seen again by a doctor or hospital in the subsequent year.

of the observed-only cases had a year[7] longer duration than that listed in table 10 provided he lived throughout the study year.

TABLE 10.—*Percentage distribution of cancer cases under observation only, by duration and sex, Dallas and Fort Worth, Tex., 1938*

Months since last treated (up to January 1, 1938)	Male	Female	Total	Months since last treated (up to January 1, 1938)	Male	Female	Total
Less than 6	41.3	34.8	37.8	72-83	0.6	1.4	1.0
6-11	21.2	21.9	21.6	84-95	.6	.5	.5
12-23	11.2	16.7	14.1	96 and over	1.1	1.4	1.3
24-35	9.5	6.7	8.0	Unknown duration	3.9	6.2	5.2
36-47	3.4	7.1	5.4				
48-59	3.9	1.9	2.8	Total	100.0	100.0	100.0
60-71	3.3	1.4	2.3				

INCIDENCE OF CANCER—NEW CASES IN 1938

The strict problem of incidence concerns the number of cases originating during a particular period of time. In the sense used here, incidence refers to the number of new cases of cancer being diagnosed in 1 year's time. Of the 2,410 cases of cancer reported as having been first seen in the study year 1,548 were residents. The resident rate, that is, the number of new cases of cancer coming to the attention of a doctor or hospital during the study year, is 255 per 100,000 population for the Dallas-Fort Worth survey area. For the areas already surveyed the corresponding rates are: Atlanta 197, Chicago 196, Pittsburgh 179, Detroit 139, and New Orleans 313. The incidence rate in this area, just as the prevalence rate, is higher than in any of the other areas except New Orleans.

The cases originating in 1938 showed little difference from all reported cases in either age or primary site distribution. The cases with relatively high fatality are somewhat better represented in the new cases. There was no significant difference in age distribution.

TABLE 11.—*Number of cancer cases first seen in 1938, by vital status, residence, sex, and color, Dallas and Fort Worth, Tex.*

Vital status (as of the end of the study year)	Number of cases first seen in the study year						
	White		Colored		Total		
	Male	Female	Male	Female	Male	Female	Both sexes
Resident cases							
Alive	453	468	18	58	471	526	997
Dead	164	167	16	25	180	192	372
Unknown	77	83	3	16	80	99	179
Total	694	718	37	99	731	817	1,548
Total cases:							
Alive	793	692	19	61	812	753	1,565
Dead	223	203	18	27	241	230	471
Unknown	174	176	5	19	179	195	374
Total	1,190	1,071	42	107	1,232	1,178	2,410

[7] More precisely, each case had a year and one half month's longer duration than here tabulated, since not only was the study year 1938 excluded, but cases last treated in December 1937 were listed as having had zero month's duration, whereas, on the average, they had had one-half month's duration by January 1, 1938. Likewise, cases first seen in November 1937, and recorded with 1 month's duration, had really averaged 1½ months, etc.

SUMMARY

A total of 2,592 cases of cancer was reported in Dallas County and 1,091 in Tarrant County during the study year. In addition, information was obtained from all of the death certificates filed during the year on which cancer appeared as a cause of death. The number of reported resident cases was 1,583 in Dallas and 798 in Tarrant County. Since it was felt that the data do not indicate a real difference in the prevalence of cancer in the actual populations of the two areas, and since the data are similar in all necessary respects, it was decided to treat the two counties as a single study area.

The prevalence rate of cancer among residents in this area was 394 per 100,000 population, a rate higher than in any of the cities surveyed earlier except New Orleans. This high rate is a result of a decidedly higher prevalence of skin cancer (140 compared with 24 in Chicago, 25 in Pittsburgh, 37 in Detroit, 129 in New Orleans, and 157 in Atlanta).

A microscopic examination of tissue confirmed the diagnosis in only half of the cancer cases reported in this area. This is lower than the percentage found in any of the other areas studied, but if cases with skin cancer are excluded the percentage of microscopic tests among the remaining cases in this area compares favorably with that of most of the other cities surveyed.

The primary sites most often involved in malignant growths are different for males and for females. Among males the order of importance of sites is skin, buccal cavity, digestive tract, and genito-urinary system. These four sites account for over 90 percent of all cases among males, while the first two include nearly two-thirds of all such cases. Among females the order is genito-urinary system (three-fourths of which are uterus), breast, skin, and digestive tract; these sites account for over 90 percent of all cases among females. Buccal cavity and respiratory cancers each are about four times as high for males as for females.

Over two-thirds of all the cases were among persons between the ages of 40 and 69. There were 153 cases of cancer among persons under 30 years of age, 48 cases among persons under 20. The mean age is somewhat lower for females than for males and lower for colored than for white persons.

There is a clear relationship between primary site and age. The percentage of cases of cancer in certain sites, particularly prostate, skin, and, to a lesser extent, digestive tract, increases markedly as age increases; female breast and uterine malignant growths, and all respiratory cancers are most frequent in persons in the middle portion of the life span (the years 35–64) while cancer of the brain, bones, and "all other sites" (including eye, glands, etc.) is relatively more frequent at ages under 35.

Forty-four percent of the cases had a duration of less than 6 months, but there were 208 cases, 6.6 percent, that had a duration of at least 5 years. There were marked differences in duration among the various sites of cancer.

The highest relative fatality was found in cancer of the brain, digestive tract, respiratory system, and "all other sites." Cancers of the skin, buccal cavity, breast (female), and genito-urinary system were relatively less fatal than all cancers combined.

At least 23 percent of the cancer cases died within 1 year of the date they were first diagnosed. About 60 percent of the cases with cancer of the digestive tract and brain died in the first year after diagnosis while only 3 percent of cases with skin cancers and 10 percent with buccal cavity cancers died that soon.

A little more than 1 case in every 10 reported was in the "cured" cancer group, that is, was under observation subsequent to successful treatment and without recurrence during the study year. Eight percent of these 389 cases under observation only had been under observation without treatment for 5 years or more.

The number of cases first diagnosed as cancer during the study year was 2,410 and the resident incidence rate of cancer was estimated at 255 per 100,000 population. This is higher than the similar rate for any of the cities previously surveyed except New Orleans.

Appendix

The following tables contain the actual figures on which the tables in the text are based. They are numbered to correspond with the related tables in the text.

TABLE 2.—*Number of sources reporting by number of cases reported and nature of source, with the actual number of cases so reported, Dallas and Fort Worth, Tex., 1938*

Number of cases reported by each source	Doctors: Number of sources	Doctors: Actual number of cases reported by all sources	Hospitals: Number of sources	Hospitals: Actual number of cases reported by all sources	All sources: Number of sources	All sources: Actual number of cases reported by all sources
No cases	312	0	24	0	336	0
1 to 5 cases	232	519	11	22	243	541
1 case	*93*	*93*	*5*	*5*	*98*	*98*
2 cases	*53*	*106*	*3*	*6*	*56*	*112*
3 cases	*43*	*129*	*2*	*6*	*45*	*135*
4 cases	*24*	*96*			*24*	*96*
5 cases	*19*	*95*	*1*	*5*	*20*	*100*
6 to 10 cases	34	261	2	16	36	277
11 to 20 cases	14	214	1	15	15	229
Over 20 cases	19	1,427	16	2,162	35	3,589
Any number of cases	*299*	*2,421*	*30*	*2,215*	*329*	*4,636*
Total reporting	611	2,421	54	2,215	665	4,636

TABLE 3.—*Number of cases of cancer reported, and number with diagnosis microscopically confirmed, by primary site, and whether reported by a hospital, Dallas and Fort Worth, Tex., 1938*

Primary site	Number of cases reported					
	By doctors only		By hospitals [1]		By all sources	
	Total	With a microscopically confirmed diagnosis	Total	With a microscopically confirmed diagnosis	Total	With a microscopically confirmed diagnosis
Buccal cavity	229	54	181	95	410	149
Digestive tract	213	98	288	159	501	257
Respiratory system	23	14	48	29	71	43
Genito-urinary system	275	204	565	441	840	645
Breast	147	109	272	191	419	300
Skin	828	132	418	168	1,246	300
Brain	27	24	9	9	36	33
Bones	14	6	23	19	37	25
All other sites	45	32	78	19	123	81
All sites	1,801	673'	1,882	1,160	3,683	1,833

[1] This includes cases reported by a hospital and by a doctor, as well as cases reported by hospitals only.

TABLE 4.—*Number of cases of cancer by primary site, sex, and color, Dallas and Fort Worth, Tex., 1938*

Primary site	Number of cases					
	White		Colored		Total	
	Male	Female	Male	Female	Male	Female
Buccal cavity	328	76	4	2	332	78
Lip	*245*	*32*	-	-	*245*	*32*
Others	*83*	*44*	*4*	*2*	*87*	*46*
Digestive tract	243	222	19	17	262	239
Stomach, duodenum	*77*	*46*	*7*	*8*	*84*	*54*
Intestines	*54*	*66*	*5*	-	*59*	*66*
Rectum, anus	*52*	*56*	*3*	*1*	*55*	*57*
Others	*60*	*54*	*4*	*8*	*64*	*62*
Respiratory system	51	14	5	1	56	15
Lungs, pleura	*24*	*6*	*3*	-	*27*	*6*
Others	*27*	*8*	*2*	*1*	*29*	*9*
Genito-urinary system	195	561	12	72	207	633
Uterus	-	*440*	-	*59*	-	*499*
Prostate	*103*	-	*5*	-	*108*	-
Kidneys, bladder	*70*	*27*	*3*	*3*	*73*	*30*
Others	*22*	*94*	*4*	*10*	*26*	*104*
Breast	2	378	-	39	2	417
Skin	836	403	3	4	839	407
Brain	19	15	1	1	20	16
Bones	24	12	1	-	25	12
All other sites	57	50	5	2	62	61
All sites	1,755	1,740	50	138	1,805	1,878

Table 5.—*Number of cases of cancer among males, by primary site and by age of patient, Dallas and Fort Worth, Tex., 1938*

Primary site	Age of patient									
	Under 15	15–24	25–34	35–44	45–54	55–64	65–74	75 and over	Unknown	All ages
Buccal cavity		6	23	47	59	59	54	18	66	332
Lip		*6*	*21*	*41*	*52*	*38*	*25*	*7*	*55*	*245*
Others			*2*	*6*	*7*	*21*	*29*	*11*	*11*	*87*
Digestive tract	1	1	10	26	49	66	63	24	22	262
Stomach, duodenum			*2*	*8*	*13*	*22*	*24*	*11*	*4*	*84*
Intestine			*2*	*7*	*9*	*19*	*11*	*6*	*5*	*59*
Rectum, anus		*1*	*6*	*6*	*12*	*11*	*13*	*1*	*5*	*55*
Others	*1*			*5*	*15*	*14*	*15*	*6*	*8*	*64*
Respiratory system	1	3	1	7	11	12	10	3	8	56
Lungs and pleura	*1*	*1*	*1*	*6*	*5*	*5*	*1*	*2*	*5*	*27*
Others		*2*		*1*	*6*	*7*	*9*	*1*	*3*	*29*
Genito-urinary system	4	1	10	14	15	33	85	31	14	207
Prostate				*1*	*3*	*16*	*57*	*22*	*9*	*108*
Others	*4*	*1*	*10*	*13*	*12*	*17*	*28*	*9*	*5*	*99*
Breast					1				1	2
Skin		4	22	62	134	157	151	92	217	839
Brain	3	3	3	3	5	2			1	20
Bones	2	6	2	1	1	7	4		2	25
All other sites	7	3	41	3	6	16	15	3	5	62
All sites	18	27	75	163	281	352	382	171	336	1,805

Table 6.—*Number of reported cancer cases among females by primary site and age of patient, Dallas and Fort Worth, Tex., 1938*

Primary site	Age of patient									
	Under 15	15–24	25–34	35–44	45–54	55–64	65–74	75 and over	Unknown	All ages
Buccal cavity				15	10	20	11	5	17	78
Lip				*6*	*5*	*9*	*1*	*1*	*10*	*32*
Others				*9*	*5*	*11*	*10*	*4*	*7*	*46*
Digestive tract		3	15	23	46	67	53	12	20	239
Stomach, duodenum				*7*	*8*	*14*	*16*	*4*	*5*	*54*
Intestine			*4*	*7*	*13*	*15*	*15*	*4*	*8*	*66*
Rectum, anus		*2*	*6*	*5*	*12*	*19*	*9*		*4*	*57*
Others		*1*	*5*	*4*	*13*	*19*	*13*	*4*	*3*	*62*
Respiratory system		1		2	4	4	1	1	2	15
Genito-urinary system	1	2	47	123	179	138	89	5	39	633
Uterus		*1*	*35*	*103*	*148*	*108*	*68*	*8*	*28*	*499*
Others	*1*	*1*	*12*	*20*	*31*	*30*	*21*	*7*	*11*	*134*
Breast			27	75	113	84	41	26	48	417
Skin	1	3	29	27	47	65	66	45	133	407
Brain	7	1	3	1		3	1			16
Bones		1			5	2	2		2	12
All other sites	3	2	6	9	13	9	11	4	4	61
All sites	12	13	118	275	417	392	278	108	265	1,878

Table 10—*Number of cancer cases which, during 1938, were under observation only, by months since last treated, by sex, Fort Worth and Dallas, Tex.*

Months since last treated (up to January 1, 1938)	White		Total[1]		Months since last treated (up to January 1, 1938)	White		Total[1]	
	Male	Female	Male	Female		Male	Female	Male	Female
Under 6	74	70	74	73	60–65	3	1	3	1
6–11	38	44	38	46	66–71	3	2	3	2
12–17	15	20	15	21	72–77		1		1
18–23	5	14	5	14	78–83	1	2	1	2
24–29	9	7	9	8	84–89		1		1
30–35	8	6	8	6	90–95	1		1	
36–41	5	9	5	10	96 and over	2	3	2	3
42–47	1	5	1	5	Unknown	7	13	7	13
48–53	4	2	5	2					
54–59	2	2	2	2	Total	178	202	179	210

[1] Includes colored

DEATHS DURING WEEK ENDED JANUARY 10, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Jan 10, 1942	Corresponding week, 1941
Data from 87 large cities of the United States:		
Total deaths	9,697	9,245
Average for 3 prior years	9,501	
Deaths under 1 year of age	602	585
Average for 3 prior years	554	
Data from industrial insurance companies:		
Policies in force	64,833,337	64,796,540
Number of death claims	11,660	10,108
Death claims per 1,000 policies in force, annual rate	9.4	8.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JANUARY 17, 1942

Summary

No significant increases were reported in the communicable diseases for the current week. Meningococcus meningitis and poliomyelitis were slightly above the 5-year (1937–41) median expectancy, but the incidence of these diseases was favorable.

A total of 3,894 cases of influenza was reported, as compared with 3,800 for the preceding week, 95,695 cases for the corresponding week last year, and a 5-year median of 12,516. The South Atlantic and South Central States reported 3,250 cases, or approximately 83 percent of the current total. Texas reported 1,561 cases, South Carolina 493, Virginia 348, Alabama 281, Arkansas 212, Arizona 165, California 160, and Oklahoma 116.

The incidence of smallpox (11 cases) and typhoid fever (70 cases) was below that for the corresponding week of each of the preceding 5 years. Of 65 cases of bacillary dysentery, Texas reported 56, and of 55 cases of endemic typhus fever, Georgia reported 21, Texas 15, and Alabama 7. One case of leprosy was reported in California. Of 34 cases of tularemia, 10 occurred in Kentucky and 5 in Ohio. No cases of anthrax or Rocky Mountain spotted fever were reported.

The crude death rate for the week for 88 large cities in the United States was 13.5 per 1,000 population, as compared with 13.6 for the preceding week and a 3-year (1939–41) average of 13.0.

Telegraphic morbidity reports from State health officers for the week ended January 17, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Jan. 17, 1942	Jan. 18, 1941		Jan. 17, 1942	Jan. 18, 1941		Jan. 17, 1942	Jan. 18, 1941		Jan. 17, 1942	Jan. 18, 1941	
NEW ENG.												
Maine	0	0	3	1	1,421	19	187	18	70	2	0	0
New Hampshire	0	0	0	-----	1,000	-----	8	6	12	0	0	0
Vermont	0	0	0	-----	81	-----	14	41	11	0	0	0
Massachusetts	0	3	4	-----	-----	-----	236	364	441	3	0	1
Rhode Island	5	0	0	-----	16	-----	40	0	5	0	0	0
Connecticut	0	0	2	2	1,718	10	146	13	161	2	0	0
MID. ATL.												
New York	24	18	31	[1] 14	[1] 215	[1] 57	348	1,504	389	5	6	5
New Jersey	2	18	13	10	95	24	112	645	445	1	3	2
Pennsylvania	12	24	33	-----	-----	-----	1,463	1,862	135	4	3	4
E. NO. CEN.												
Ohio	4	8	33	35	2,799	88	84	565	70	2	1	1
Indiana	14	11	20	26	703	25	31	55	12	1	0	1
Illinois	28	22	37	21	83	36	89	879	48	4	1	4
Michigan [2]	4	5	11	1	236	15	88	1,098	440	2	0	1
Wisconsin	1	0	2	16	152	61	439	421	404	0	1	0
W. NO. CEN.												
Minnesota	5	0	4	2	6	3	177	6	31	0	2	0
Iowa	0	8	6	-----	285	11	134	183	49	0	0	0
Missouri	5	7	19	5	218	95	54	15	7	2	1	0
North Dakota	0	5	0	13	268	42	85	10	5	1	1	0
South Dakota	2	2	2	2	1	1	9	11	5	0	0	0
Nebraska	1	3	3	-----	64	-----	11	8	8	0	0	0
Kansas	12	4	10	16	2,040	99	165	169	141	0	1	0
SO. ATL.												
Delaware	2	0	2	-----	54	2	2	20	2	0	0	0
Maryland	4	3	6	10	300	37	177	11	12	10	0	0
Dist. of Col.	3	2	5	1	172	10	8	4	7	0	0	1
Virginia	11	12	25	348	13,592	420	141	194	168	3	1	3
West Virginia	7	2	14	11	14,003	52	189	58	54	0	11	1
North Carolina	16	28	33	8	750	40	451	169	98	2	0	2
South Carolina	11	7	7	493	11,004	673	122	70	62	0	1	2
Georgia	7	10	13	93	10,702	136	259	64	26	0	0	0
Florida	4	4	9	14	814	12	45	8	11	0	1	0
E. SO. CEN.												
Kentucky	5	5	15	6	2,666	65	26	65	84	1	0	2
Tennessee	5	9	12	92	3,994	252	98	49	67	1	1	3
Alabama	18	10	15	281	8,622	384	27	87	68	2	1	5
Mississippi [2]	8	5	9	-----	-----	-----	-----	-----	-----	2	2	1
W. SO. CEN.												
Arkansas [3]	16	11	11	212	3,999	245	127	61	21	0	1	0
Louisiana	10	7	13	4	2,164	51	20	2	2	1	1	1
Oklahoma	13	13	14	116	2,516	263	129	0	13	0	0	0
Texas	60	28	57	1,561	12,841	895	650	84	216	7	7	2
MOUNTAIN												
Montana	0	1	1	8	901	26	59	5	7	0	0	0
Idaho	4	0	1	5	3	6	10	0	46	0	0	0
Wyoming	0	4	1	36	942	-----	22	4	5	1	0	0
Colorado	9	9	12	68	1,095	80	322	32	43	0	0	1
New Mexico	1	0	2	4	69	6	120	25	35	0	0	0
Arizona	0	8	4	165	711	242	88	64	10	2	0	0
Utah [2]	0	1	0	1	793	1	24	19	72	1	0	1
Nevada	0	1	-----	-----	109	-----	5	0	-----	0	0	-----
PACIFIC												
Washington	2	2	1	5	448	4	25	60	50	0	2	1
Oregon	0	4	2	28	276	274	65	102	27	0	0	0
California	18	20	29	160	2,327	223	1,135	105	116	6	4	1
Total	353	344	652	3,894	107,270	12,516	8,266	9,234	9,857	68	53	46
2 weeks	758	647	1,291	7,694	202,965	22,146	16,158	21,235	16,527	113	99	103

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended January 17, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Jan. 17, 1942	Jan. 18, 1941		Jan. 17, 1942	Jan. 18, 1941		Jan. 17, 1942	Jan. 18, 1941		Jan. 17, 1942	Jan. 18, 1941	
NEW ENG.												
Maine	0	0	0	28	6	16	0	0	0	2	0	1
New Hampshire	0	0	0	14	9	8	0	0	0	0	0	0
Vermont	0	0	0	2	12	6	0	0	0	0	0	0
Massachusetts	0	0	0	299	117	191	0	0	0	4	0	2
Rhode Island	0	0	0	12	5	4	0	0	0	0	0	0
Connecticut	0	0	0	30	50	73	0	0	0	3	1	0
MID. ATL.												
New York	6	2	1	318	386	481	0	0	0	1	7	8
New Jersey	1	0	0	104	238	173	0	0	0	0	0	2
Pennsylvania	0	1	0	271	276	352	0	0	0	6	4	13
E. NO. CEN.												
Ohio	2	1	2	267	223	433	0	0	9	2	2	5
Indiana	0	0	0	135	127	157	1	1	5	1	3	1
Illinois	1	2	1	231	380	513	0	0	10	3	2	3
Michigan [2]	0	1	1	173	195	500	0	5	2	1	3	2
Wisconsin	0	4	1	141	135	203	0	10	6	1	1	0
W. NO. CEN.												
Minnesota	1	0	1	77	56	134	1	10	18	2	0	1
Iowa	1	0	0	30	54	107	0	9	18	2	3	0
Missouri	0	1	0	92	77	148	5	5	19	1	7	2
North Dakota	0	0	0	15	5	21	0	0	2	0	1	0
South Dakota	0	0	0	53	23	22	0	0	2	0	0	0
Nebraska	0	0	0	60	31	39	0	2	1	0	0	1
Kansas	0	3	1	93	94	160	0	1	20	0	0	1
SO. ATL.												
Delaware	0	0	0	33	18	13	0	0	0	1	0	0
Maryland	0	0	0	53	63	66	0	0	0	1	4	1
Dist. of Col.	0	1	0	12	18	22	0	0	0	0	0	1
Virginia	0	0	0	32	39	54	0	0	0	5	2	2
West Virginia	0	0	0	61	60	66	0	0	0	1	1	2
North Carolina	0	1	1	49	66	63	0	0	0	0	0	4
South Carolina	0	0	0	9	15	11	0	0	0	1	3	1
Georgia	1	0	0	20	26	24	0	1	0	6	2	2
Florida	0	1	1	7	3	8	0	0	0	0	0	2
E. SO. CEN.												
Kentucky	0	0	1	70	54	70	0	0	2	0	0	1
Tennessee	1	2	0	64	92	48	0	0	0	4	2	2
Alabama	2	0	1	36	26	24	1	0	0	0	0	1
Mississippi [2]	2	0	0	8	13	10	0	0	0	1	0	1
W. SO. CEN.												
Arkansas [3]	2	0	1	10	9	18	0	0	3	3	4	2
Louisiana	0	2	0	4	5	15	0	0	0	8	11	7
Oklahoma	0	0	0	33	26	39	1	5	3	0	2	2
Texas	1	1	1	46	46	111	0	1	12	4	6	12
MOUNTAIN												
Montana	3	0	0	42	26	52	0	0	2	0	0	0
Idaho	0	2	0	14	13	19	1	0	14	0	0	0
Wyoming	0	1	0	10	6	8	0	0	1	0	0	0
Colorado	1	1	0	38	23	31	0	0	15	1	0	1
New Mexico	0	0	0	7	6	14	0	0	0	0	1	2
Arizona	0	0	0	3	2	7	1	0	0	0	1	2
Utah [2]	0	0	0	26	5	24	0	0	0	1	2	0
Nevada	0	0	----	0	0	----	0	0	----	0	0	----
PACIFIC												
Washington	0	2	0	31	38	49	0	0	6	0	2	1
Oregon	0	0	0	14	11	63	0	2	12	1	0	3
California	4	1	3	115	107	206	0	0	4	3	2	2
Total	29	30	26	3,292	3,315	5,287	11	52	315	70	79	122
2 weeks	57	66	47	6,393	6,538	9,746	21	105	591	154	165	220

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended January 17, 1942—Con

Division and State	Whooping cough, Week ended— Jan 17 1942	Whooping cough, Week ended— Jan 18 1941	Week ended Jan 17, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mt spotted fever	Tularemia	Typhus fever
NEW ENG											
Maine	34	10	0	0	0	0	0	0	0	0	0
New Hampshire	3	1	0	0	0	0	0				-
Vermont	32	18	0	0	0	0	0	0	0	0	0
Massachusetts	202	216	0	1	2	0	1	0	0	0	1
Rhode Island	119	13	0	0	0	0	0	0	0	0	0
Connecticut	150	75	0	0	0	0	0	0	0	0	0
MID ATL											
New York	577	451	0	0	0	0	0	0	0	0	0
New Jersey	227	140	0	0	0	0	0	0	0	0	0
Pennsylvania	310	562	0	0	0	0	2	0	0	0	0
E NO CEN											
Ohio	221	383	0	0	0	0	1	0	0	5	0
Indiana	59	18	0	0	0	0	0	0	0	1	0
Illinois	225	133	0	0	1	0	0	0	0	1	0
Michigan [2]	181	349	0	0	0	0	0	0	0	0	0
Wisconsin	261	115	0	0	0	0	0	0	0	0	0
W NO CEN											
Minnesota	56	72	0	1	0	0	0	0	0	1	0
Iowa	11	43	0	0	0	0	0	0	0	0	0
Missouri	22	38	0	0	0	2	0	0	0	2	0
North Dakota	2	15	0	0	0	0	0	0	0	0	0
South Dakota	7	5	0	0	0	0	0	0	0	0	0
Nebraska	6	61	0	0	0	0	0	0	0	0	0
Kansas	56	65	0	0	0	0	0	0	0	1	0
SO ATL											
Delaware	1	7	0	0	0	0	0	0	0	0	0
Maryland	84	80	0	0	0	0	0	0	0	0	0
Dist of Col	32	14	0	0	0	0	0	0	0	0	0
Virginia	22	89	0	0	0	13	0	0	0	0	0
West Virginia	24	59	0	0	0	0	0	0	0	0	0
North Carolina	197	370	0	0	0	0	0	0	0	2	1
South Carolina	66	97	0	0	0	0	0	0	0	2	3
Georgia	13	24	0	0	0	0	0	0	0	0	21
Florida	21	11	0	0	0	0	0	0	0	0	4
E SO CEN											
Kentucky	89	23	0	0	0	0	0	0	0	10	0
Tennessee	32	49	0	0	0	1	0	0	0	4	0
Alabama	5	52	0	0	0	0	0	0	0	0	7
Mississippi [2]			0	0	0	0	0	0	0	0	0
W SO CEN											
Arkansas [3]	11	24	0	0	0	0	0	0	0	3	0
Louisiana	4	4	0	0	0	0	0	0	0	2	2
Oklahoma	6	24	0	0	0	0	0	0	0	0	0
Texas	88	138	0	6	56	0	1	0	0	0	15
MOUNTAIN											
Montana	9	6	0	0	0	0	0	0	0	0	0
Idaho	6	10	0	0	0	0	1	0	0	0	0
Wyoming	8	0	0	0	0	0	0	0	0	0	0
Colorado	29	33	0	0	0	0	0	0	0	0	0
New Mexico	10	12	0	0	0	0	1	0	0	0	0
Arizona	24	29	0	0	0	8	0	0	0	0	0
Utah [2]	24	50	0	0	0	0	0	0	0	0	0
Nevada	4	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	76	103	0	0	0	0	0	0	0	0	0
Oregon	36	10	0	0	0	0	0	0	0	0	0
California	182	436	0	2	6	0	0	1	0	0	1
Total	3 864	4 537	0	10	65	24	7	1	0	34	55
2 weeks	7 728	9 324	1	24	103	56	13	4	0	72	121

[1] New York City only

[2] Period ended earlier than Saturday

[3] Inclusive of delayed reports as follows Diphtheria, 3 cases, influenza, 9, scarlet fever, 3, tularemia, 2.

WEEKLY REPORTS FROM CITIES

City reports for week ended January 3, 1942

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	10	0	0	0	2	0	4	0	0	0
Baltimore, Md	1	0	8	4	152	3	12	0	18	0	2	15
Barre, Vt	0	0	-	0	0	0	0	0	0	0	0	0
Billings, Mont	0	0	--	0	0	0	0	0	2	0	0	0
Birmingham, Ala	2	0	6	1	3	0	5	0	5	0	0	2
Boise, Idaho	0	0	-	0	0	0	2	0	0	0	0	0
Boston, Mass	2	0	-	1	43	1	16	0	58	0	1	14
Bridgeport, Conn	0	0	-	0	2	0	2	0	2	0	0	0
Brunswick, Ga	0	0	-	0	0	0	0	0	0	0	0	0
Buffalo, N Y	0	0		0	1	0	11	0	16	0	0	7
Camden, N J	0	0	2	2	1	0	3	0	1	0	0	5
Charleston, S C	0	0	55	1	0	0	2	0	1	0	0	0
Charleston, W Va	1	0		0	1	0	0	0	0	0	0	0
Chicago, Ill	25	0	10	3	24	0	29	0	59	0	1	98
Cincinnati, Ohio	2	0		1	1	0	4	0	18	0	0	12
Cleveland, Ohio	0	0	9	0	4	1	8	0	26	0	0	27
Columbus, Ohio	0	0	-	0	4	0	5	0	2	0	0	0
Concord, N H	0	0	-	0	0	0	0	0	3	0	0	0
Cumberland, Md	0	0	-	0	5	0	1	0	1	0	0	0
Dallas, Tex	1	0	2	2	13	0	4	0	3	0	0	1
Denver, Colo	4	0	32	0	42	0	4	0	3	0	0	7
Detroit, Mich	3	0		1	18	1	15	1	65	0	0	44
Duluth, Minn	0	0	--	0	0	0	1	0	6	0	0	0
Fall River, Mass	0	0	-	0	3	0	0	0	24	0	0	5
Fargo, N. Dak	0	0	-	0	0	0	0	0	0	0	0	1
Flint, Mich	0	0	-	0	0	0	1	0	1	0	0	4
Fort Wayne, Ind	0	0	---	0	0	0	2	0	2	0	0	0
Frederick, Md	0	0	--	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	---	0	0	0	4	0	0	0	0	0
Grand Rapids, Mich	0	0	-	1	6	0	2	0	5	0	0	11
Great Falls, Mont	0	0	--	0	28	0	0	0	2	0	0	3
Hartford, Conn	0	0	-	0	2	0	2	0	5	0	0	2
Helena, Mont	0	0	--	0	0	0	0	0	0	0	0	0
Houston, Tex	1	0	----	0	0	0	4	0	2	0	0	1
Indianapolis, Ind	0	0	--	2	1	0	10	0	12	0	0	10
Kansas City, Mo	0	0	1	2	0	0	6	0	7	0	0	1
Kenosha, Wis	0	0	----	0	0	0	0	0	1	0	0	2
Little Rock, Ark	0	0	7	0	6	0	2	0	1	0	0	1
Los Angeles, Calif	2	0	12	2	17	0	6	0	19	0	0	8
Lynchburg, Va	0	0		0	0	0	1	0	1	0	0	0
Memphis, Tenn	0	0	10	1	4	0	5	0	5	0	1	11
Milwaukee, Wis	0	0	------	0	3	0	5	0	23	0	1	93
Minneapolis, Minn	1	0	----	0	1	0	2	0	15	0	0	1
Missoula, Mont	0	0	-----	0	0	0	0	0	1	0	0	0
Mobile, Ala	0	0	-----	1	5	1	0	0	0	0	0	0
Nashville, Tenn	1	0	--	1	1	0	4	0	5	0	0	0
Newark, N J	0	0	4	1	23	0	8	0	13	0	0	18
New Haven, Conn.	0	0	--	0	35	0	0	0	1	0	0	3
New Orleans, La	2	0	3	0	0	0	7	1	2	0	2	0
Omaha, Nebr	0	0	---	0	2	0	1	0	5	0	0	0
Philadelphia, Pa	5	0	1	0	6	1	18	0	45	0	0	39
Pittsburgh, Pa	0	0	3	1	4	1	13	0	12	0	0	6
Portland, Maine	1	0	------	0	1	0	6	0	6	0	0	2
Providence, R. I	3	0	-----	0	5	0	3	0	5	0	1	28
Pueblo, Colo	0	0	------	0	200	0	3	0	4	0	0	0
Racine, Wis	0	0	------	0	1	0	0	0	4	0	0	15
Raleigh, N. C	0	0	------	0	0	0	3	0	3	0	0	5
Reading, Pa	0	0	1	0	1	0	0	0	0	0	0	2
Richmond, Va	1	0	------	1	0	0	2	0	3	0	0	0

City reports for week ended January 3, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va	0	0	-----	0	0	0	0	0	1	0	0	0
Rochester, N Y	0	0	------	0	0	0	5	0	5	0	0	2
Sacramento, Calif	1	0	---	0	27	0	3	0	4	0	0	3
Saint Joseph, Mo	0	0	-	0	5	0	4	0	1	0	0	0
Saint Louis, Mo	2	0	2	1	7	0	7	0	15	0	1	6
Saint Paul, Minn	0	0	1	1	71	0	10	0	3	0	0	14
Salt Lake City, Utah	0	0	-	0	0	0	3	0	2	0	0	3
San Antonio, Tex	1	0	3	0	0	0	10	0	1	0	0	0
Savannah, Ga	0	0	1	1	15	0	1	0	1	0	0	1
Seattle, Wash	0	0	--	0	1	0	4	0	2	0	0	11
South Bend, Ind	0	0	----	0	0	0	0	0	2	0	0	3
Spokane, Wash	0	0	----	0	4	0	2	0	2	0	0	7
Springfield, Ill	0	0	----	0	0	0	1	0	4	0	0	0
Springfield, Mass	0	0	---	0	2	0	1	0	11	0	0	12
Superior, Wis	0	0	--	----	0	0	2	0	0	0	0	3
Syracuse, N Y	0	0	--	0	0	0	2	0	3	0	0	18
Tacoma, Wash	0	0	-	0	0	0	1	0	1	0	0	4
Tampa, Fla	0	0	2	1	0	0	2	0	1	0	1	0
Terre Haute, Ind	0	0	-	0	0	0	2	0	0	0	0	0
Topeka, Kans	0	0		0	1	0	0	0	4	0	0	4
Trenton, N J	0	0	2	0	0	0	2	0	7	0	0	2
Washington, D C	4	0	---	1	6	0	8	0	11	0	1	23
Wheeling, W Va	0	0		0	58	0	1	0	1	0	0	0
Wichita, Kans	1	0	1	0	22	0	2	0	7	0	0	1
Wilmington, Del	0	0	---	0	2	0	4	0	11	0	0	0
Wilmington N C	0	0	--	0	30	0	1	0	1	0	0	1
Winston-Salem, N C	1	0	1	0	27	0	3	0	5	0	0	0
Worcester Mass	0	-	---	0	1	0	3	0	31	0	0	16

Typhus fever—Cases Birmingham, 1, Charleston, S C, 2, Los Angeles, 1, New Orleans, 1, Savannah, 4.

Rates [1] *(annual basis) per 100,000 population for a group of 87 selected cities (population, 1942, 25,781,222)*

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
Week ended Jan 3, 1942	13 75	38 23	9 51	195 78	66 74	134 29	0 00	2 22	126 61
Average for week, 1937–41	21 57	356 06	20 14	356 06	122 89	217 70	5 29	3 26	188 61

[1] The estimated aggregate population on which the 1942 rates are computed is probably too low, in view of unusual shifts of population incident to emergency conditions It is based on unofficial estimates, 1940 census enumeration, and for some cities the projection of intercensal rates of increase.

TERRITORIES AND POSSESSIONS

HAWAII TERRITORY

Plague (rodent).—Five rats found during the period November 21 to November 26, 1941, in Paauhau, Hamakua District, Island of Hawaii, T. H., have been proved positive for plague.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended December 20, 1941.—During the week ended December 20, 1941, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		2	2	6	8				1	19
Chickenpox		30		214	541	90	81	12	116	1,084
Diphtheria		11	4	31	6	1	1	2		56
Dysentery									15	15
Influenza		14			2	38			53	107
Measles		1	3	409	89	48	50		17	617
Mumps		6		430	162	55	64	8	112	837
Pneumonia		2			6		1		12	21
Poliomyelitis					1		1	1	2	5
Scarlet fever	1	24	9	105	286	25	35	19	9	513
Tuberculosis	3	9	4	114	38	1	19			188
Typhoid and paratyphoid fever				13	2			1	2	18
Whooping cough			2	144	79	9	7	4	44	289

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

Plague

Peru.—During the month of November 1941, plague has been reported in Peru as follows: Ancash Department, 9 cases, 5 deaths; Libertad Department, 4 cases, 2 deaths; Lima Department, 2 cases, 1 death; Piura Department, 8 cases, 1 death.

Typhus Fever

Algeria.—During the period December 1–10, 1941, 527 cases of typhus fever were reported in Algeria. The following numbers of cases of typhus fever in Algeria were also reported: For July, 1,331 cases; August, 647 cases; September, 216 cases; October, 326 cases; and for November, 667 cases.

Yellow Fever

Ivory Coast—Azaguie.—On January 6, 1942, 1 suspected case of yellow fever was reported in Azaguie, Ivory Coast.

THE SOCIO-ECONOMIC AND EMPLOYMENT STATUS OF URBAN YOUTH IN THE UNITED STATES, 1935–36 [1]

A Review

Based on data of the National Health Survey, this study presents a detailed analysis of the employment, educational, and occupational status of urban youth in the United States. The study shows separately for the white and colored youth not only the relationship between the education and occupation of youth and their employment, but also relates employment to annual family income. The high concentration of unemployment among youth, white and colored, has been a well-known fact. However, the existence of wide differences in the employment of youth in the various income classes was for the first time revealed by the present analysis. The study likewise discloses a direct association between education of the white youth and their employment; the data indicate striking increase in employment with higher education. The contrary is true of the colored youth; their employment generally decreases with higher education. Furthermore, the study brings out the close connection between economic status, education, and occupation.

The contents of the bulletin are: I. Introduction: The scope and method of the Survey, the concepts of employment and unemployment, workers and nonworkers, racial composition of the surveyed population. II. White urban youth: General and economic characteristics of the white youth, white youth in the labor market, employment and unemployment among white youth, employment of white youth by family income, relationship between the educational attainment of the white youth workers and their employment status, relationship between the occupation of the white youth workers and their employment status. III. Colored urban youth: General and economic characteristics of the colored youth, colored youth in the labor market and their employment status, employment of colored youth by family income, relationship between the educational attainment of the colored youth workers and their employment status, relationship between the occupations of the colored youth workers and their employment status. IV. Summary. The study reflects, of course, the socio-economic condition of the midwinter of 1935–36, when the Survey was made.

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[1] Public Health Bulletin No. 273, same title as above, by Bernard D. Karpinos. U. S. Government Printing Office, 1941. Available from the Superintendent of Documents, Washington, D. C., at 15 cents per copy.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

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Public Health Reports

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Public Health Reports

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NUTRITIONAL DEFICIENCY AND INFECTION

I. Influence of Riboflavin or Thiamin Deficiency on Fatal Experimental Pneumococcal Infection in White Mice [1]

By JERALD G. WOOLEY, *Bacteriologist*, and W. H. SEBRELL, *Surgeon, United States Public Health Service*

There is a considerable amount of evidence which suggests a relationship between deficient diets and infections in experimental animals. Webster (*1*) reported a decrease in mortality in mice infected with *B. enteritidis* following a change in diet. Watson, Wilson, and Topley (*2*) found that mice fed a diet containing, among other things, dried skimmed milk and oatmeal were more resistant to natural infection with *Bact. typhi murium* than were mice fed on a diet from which the dried skimmed milk was omitted. Church (*3*) observed that the survival of mice inoculated with *Salmonella enteritidis* was dependent on heredity and nutrition. In addition to much other evidence of a general nature there are also indications of a relationship between infection and specific vitamin deficiencies. Pemberton and Bessey (*4*) have found a loss of resistance to murine typhus in riboflavin deficient rats, and Badger and Masunaga (*5*) report that rats on a thiamin deficient diet are more susceptible to rat leprosy than normal rats.

The following investigations were undertaken to determine whether there is a relationship between riboflavin and thiamin deficiency and susceptibility to fatal infection with pneumococcus in mice.

EXPERIMENTAL

The strain of mice used in these experiments was a pure strain of Swiss mice obtained from the United States Army Medical School about 4 years ago, and has been maintained at the National Institute of Health by promiscuous mating.

[1] From the Division of Chemotherapy, National Institute of Health.

All studies except those made by paired feeding on litter mates were made on equal numbers of male and female mice. Young mice approximately 4 weeks old, weighing 12 to 15 grams, were employed. The mice were placed in individual glass jars on sawdust in the earlier studies or in individual wire cages with no bedding in later tests.

The basic diet fed throughout these experiments consisted of:

Casein, leached, 70 percent alcohol extracted	20 percent
Sucrose (cane sugar)	71 percent
Wesson oil	5 percent
Salt mixture O. and M. 550 modification [2]	4 percent
Carotene in oil (7,500 U. S. P. units per gram)	0.85 mg. per gram of diet
Vitamin D_2 in propylene glycol (40,000 I. U. per gram)	0.4 mg. per gram of diet

In addition the vitamins were added in varying amounts as indicated in table 1.

TABLE 1.—*Amount of vitamins added per gram of basal diet*

Vitamins	Diet number						
	541	541E	541F	597A	597E	597AX	597EX
	Milligrams	*Milligrams*	*Milligrams*	*Milligrams*	*Milligrams*	*Milligrams*	*Milligrams*
Choline hydrochloride	0 3	0 3	0 3	0 3	0 3	0 6	06
Nicotinic acid	1	.1	.1	.1	.1	.2	2
Inositol	1	.1	1	.1	1	2	2
	Micrograms	*Micrograms*	*Micrograms*	*Micrograms*	*Micrograms*	*Micrograms*	*Micrograms*
Pyridoxine hydrochloride	4	4	4	7	7	14	14
Thiamin hydrochloride	6 7	6 7	5	7	7	14	14
Riboflavin	6 7	5	6 7	7	5	14	5
Calcium pantothenate	7	7	7	15	15	30	30

Each group of mice was fed on the various diets for 14 to 21 days in order to allow relative deficiencies to develop in those mice on diets containing restricted amounts of thiamin or riboflavin. At the end of this conditioning period the mice on each diet were divided equally into test and control groups. Mice in the control groups were then lightly etherized and 0.02 to 0.03 ml. of sterile beef infusion broth containing 0.1 ml. sterile defibrinated rabbit blood per 10 ml. of broth was placed on the nose and was allowed to be inhaled. The mice in the test groups were next inoculated with a culture of pneumococcus type I in the following manner: One mouse from each test group on the various diets, taken successively, was lightly etherized and 0.02 to 0.03 ml. of pneumococcus culture was placed on the nose and was allowed to be inhaled. Care was taken that the mouse was under the exact degree of anesthesia to prevent blowing or spattering of the culture. Following the inoculation the mice were observed for

[2] The salt mixture was prepared by the method described by Osborne and Mendel (J Biol. Chem, 37 572 (1919)) except that the following changes were made NaF was reduced to 1 percent of the original value and 0 2 gm $CuSO_4$ was added.

10 days. Deaths occurring were recorded and cultures of the heart blood were made from representative numbers.

The culture of pneumococcus for inoculation was grown in beef infusion broth, that previously had been found to support good growth of the organism, with 0.1 ml. of defibrinated rabbit blood per 10 ml. of broth for 5 hours at 37° C. If good growth was obtained the organisms were tested for capsule swelling with specific diagnostic serum. Only cultures that showed good capsules were used

The effect of diet 541, riboflavin deficient diet 541E and thiamin deficient diet 541F on the rate of growth and survival of mice was demonstrated by a 24-day feeding test on 25 males and 25 females on each diet. Mice fed diet 541 gained weight over the period observed in these tests. Whereas the mice fed on diets 541E and 541F, which contained 0.5 microgram per gram of riboflavin and thiamin chloride,

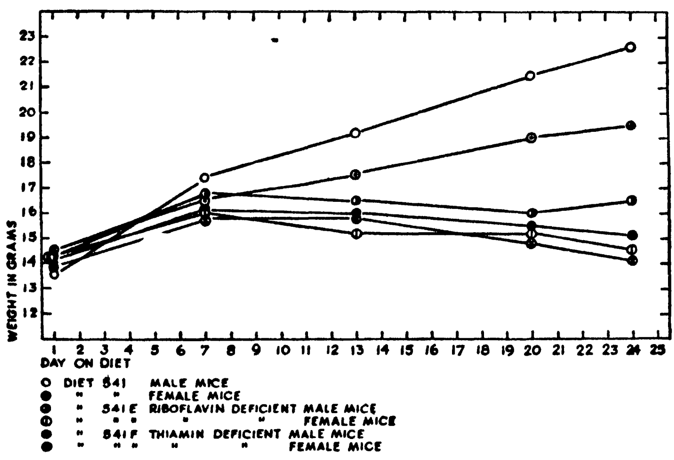

FIGURE 1.—Average rate of growth of mice fed on different diets.

respectively, had a weight curve parallel to those on 541 for 1 week, following this period their weight curve became stationary or showed a tendency to decline. Although the 0.5 microgram of riboflavin or thiamin chloride was sufficient to maintain life for the period observed, relative deficiency is indicated by the failure to gain weight on a parallel with the mice that received larger amounts of each of the two vitamins. The rate of growth is shown in figure 1.

Experiment 1.—Forty male and 40 female mice were fed as follows: 10 males and 10 females were fed ad lib. on diet 541; 15 males and 15 females received riboflavin deficient diet 541E; and 15 males and 15 females were given thiamin deficient diet 541F. Three weeks later 5 male and 5 female mice from each group were inoculated with pneumococcus type I by the intranasal route. In a like manner 5 males and 5 females were inoculated with pneumococcus type II. The remaining mice fed on diets 541E and 541F were inoculated in the

same manner with the sterile blood broth. The results are summarized in table 2 which shows that pneumococci of type I strain were less virulent for mice in each group and that more deaths occurred in the mice on the deficient diets inoculated with either type I or type II. The type I strain was used in the remainder of the experiments. The virulence was maintained by frequent passage of the seed organism through mice by intraperitoneal inoculation and recovery from the heart blood.

TABLE 2.—*Results of experiment 1*

Diet	Days on diet before inoculation	Day of death following inoculation										Remarks
		1	2	3	4	5	6	7	8	9	10	
INOCULATED WITH STERILE BLOOD BROTH												
541E	21											All 10 survived.
541F	21						1					1 died; 9 survived.
INOCULATED WITH PNEUMOCOCCUS TYPE I												
541	21							1				1 died; 9 survived.
541E	21			3	1		1					5 died; 5 survived.
541F	21			2	1	2	2					7 died. 3 survived.
INOCULATED WITH PNEUMOCOCCUS TYPE II												
541	21	1		3	1							5 died. 5 survived.
511F	21	3	2	2		1						8 died; 2 survived
541F	21	1	5	3	1							10 died; None survived.

Experiment 2.—Three groups of 100 mice each were fed diet 541, riboflavin deficient diet 541E, and thiamin deficient diet 541F, respectively. During the conditioning period before inoculation 2 mice from the first group, 3 from the second, and 1 from the third group died. After 21 days on the diet, 50 mice from each group were inoculated with pneumococci type I and the remainder were inoculated with sterile blood broth by the intranasal route. During the next 10 days 18 of the 50 inoculated mice on diet 541, 35 of those on diet 541E, and 37 on diet 541F died. Of the controls none of 48 on 541, 1 of 47 on 541E, and 7 of 49 on 541F died. Thus more of the inoculated mice died and death occurred earlier in mice on both the thiamin and riboflavin deficient diets than in the mice on diet 541. The results are summarized in table 3.

TABLE 3.—*Results of experiment 2*

INOCULATED WITH PNEUMOCOCCUS TYPE I

Diet	Days on diet before inoculation	Day of death following inoculation										Remarks
		1	2	3	4	5	6	7	8	9	10	
541	21	—	—	1	1	—	6	8	2	—	—	18 died; 32 survived.
541E	21	—	1	14	8	8	2	1	—	—	1	35 died; 15 survived
541F	21	2	4	11	7	6	4	3	—	—	—	37 died; 13 survived.
INOCULATED WITH STERILE BLOOD BROTH												
541	21	—	—	—	—	—	—		—	—	—	None died. 48 survived.
541E	21	—	—	—	—	1	—	—	—	—	—	1 died; 46 survived
541F	21	2	—	—	—	1	2	1	1	—	—	7 died; 42 survived

Experiment 3.—Three groups of 100 mice each were placed on diet 541, riboflavin deficient diet 541E, and thiamin deficient diet 541F, respectively. Half of each group was inoculated after 14 days on the diet. In this test the pneumococci appeared to be less virulent than in the previous test, as shown by only 8 deaths among the 50 mice on diet 541, as compared with 18 deaths among those on the same diet in the previous test. It will be noted, however, that there were more deaths, and that deaths occurred earlier, among the mice on both deficient diets than among those on diet 541. The results are summarized in table 4.

TABLE 4.—*Results of experiment 3*

INOCULATED WITH PNEUMOCOCCUS TYPE I

Diet	Days on diet before inoculation	Day of death following inoculation										Remarks
		1	2	3	4	5	6	7	8	9	10	
541	14	—	—	2	2	2	—	—	2	—	—	8 died; 42 survived
541E	14	—	—	3	2	7	3	—	—	—	—	15 died; 35 survived
541F	14	—	—	4	4	2	1	2	—	—	—	13 died; 37 survived
INOCULATED WITH STERILE BLOOD BROTH												
541	14	—	—	—	—	—	—	—			—	50 survived
541E	14	—	—	—	—	—	—	—	—	1		1 died; 49 survived
541F	14	—	—	—	—	—	—	—	—	1		1 died; 49 survived

Experiment 4.—Two groups of 30 mice each were placed on diet 541 and 6 groups of 30 mice were fed riboflavin deficient diet 541E.

After 14 days one group of mice on 541 and three of the groups on riboflavin deficient diet 541E were inoculated with pneumococcus type I, as test groups. The remaining mice were similarly inoculated with sterile blood broth as control groups. Beginning on the day of inoculation 30 of the test mice and 30 of the control mice that were being fed riboflavin deficient diet 541E were given daily 100 micrograms of sodium riboflavin [3] in 0.2 ml. distilled water by subcutaneous injections and 30 test mice and 30 controls on the same diet were offered 100 micrograms of sodium riboflavin in 0.2 ml. distilled water in supplement cups. Among the inoculated mice in this test, 11 of 30 mice on diet 541 died while 17 of the 30 on riboflavin deficient diet 541E died. Seventeen of the 30 on riboflavin deficient diet 541E that received sodium riboflavin subcutaneously and 18 of 30 that received it in supplement cups died. No deaths occurred among the controls. The results are summarized in table 5.

TABLE 5.—*Results of experiment 4*

INOCULATED WITH PNEUMOCOCCUS TYPE I

Diet	Days on diet before inoculation	Supplement	Day of death following inoculation										Remarks
			1	2	3	4	5	6	7	8	9	10	
541	14	None				4	4	2		1			11 died, 19 survived
541E	14	None			6	5	2	2	1	1			17 died, 13 survived
541E	14	100 micrograms sodium riboflavin subcutaneously	-	1	--	2	8	4	1	1	-		17 died, 13 survived
541E	14	100 micrograms sodium riboflavin orally				5	4	4	2	3			18 died, 12 survived

INOCULATED WITH STERILE BLOOD BROTH

Diet	Days on diet before inoculation	Supplement	1	2	3	4	5	6	7	8	9	10	Remarks
541	14	None											30 survived
541F	14	None											Do
541E	14	100 micrograms sodium riboflavin subcutaneously											Do
541E	14	100 micrograms sodium riboflavin orally						-		-			Do

The average weight curves of the control mice showed that the mice on diet 541 continued to grow throughout the period of the test, whereas all mice on riboflavin deficient diet 541E lost weight during the second week on the diet. After the supplements of sodium riboflavin were begun both groups gained weight. The weight of those on riboflavin deficient diet 541E that received no supplement of riboflavin was practically unchanged. Weight curves are given in figure 2.

Experiment 5.—This experiment was similar to experiment 4 except that thiamin deficient diet 541F was used instead of riboflavin deficient

[3] Sodium riboflavin is a water-soluble riboflavin preparation.

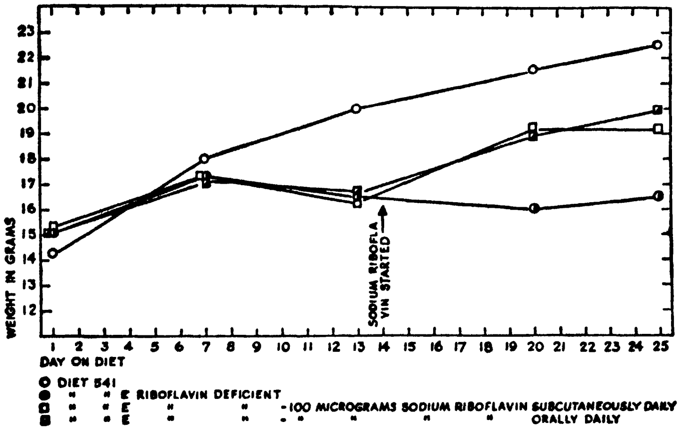

FIGURE 2.—Average rate of growth of male mice in experiment 4

diet 541E. Groups of 30 mice were used and 200 micrograms of thiamin chloride were given subcutaneously and orally instead of sodium riboflavin. The mice that received the thiamin in the supplement cups took the supplement irregularly and the amount consumed was not determined.

Five of the 30 mice on diet 541 died; 9 of the 30 mice on the thiamin deficient diet 541F, 14 of the 30 on thiamin deficient diet 541F that received thiamin subcutaneously, and 8 of 30 that were offered it in supplement cups died. No deaths occurred among the controls. The results are summarized in table 6.

TABLE 6.—*Results of experiment 5*

INOCULATED WITH PNEUMOCOCCUS TYPE I

Diet	Days on diet before inoculation	Supplement	Day of death following inoculation: 1	2	3	4	5	6	7	8	9	10	Remarks
541	14	None		1	2	1		1					5 died; 25 survived
541F	14	None		3	3	2		1					9 died; 21 survived
541F	14	200 micrograms of thiamin chloride subcutaneously daily		3	3		1	3	2	1	1		14 died; 16 survived
541F	14	200 micrograms of thiamin chloride orally daily			3			3	2				8 died; 22 survived.

INOCULATED WITH STERILE BLOOD BROTH

Diet	Days on diet before inoculation	Supplement	1	2	3	4	5	6	7	8	9	10	Remarks
541	14	None											30 survived.
541F	14	None											Do
541F	14	200 micrograms of thiamin chloride subcutaneously daily											Do.
541F	14	200 micrograms of thiamin chloride orally daily											Do.

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The average weight curves of the control mice (fig. 3) on the thiamin deficient diet increased after supplements of thiamin were begun as contrasted with the steady decrease in weight of the mice on the deficient diet that received no thiamin supplement.

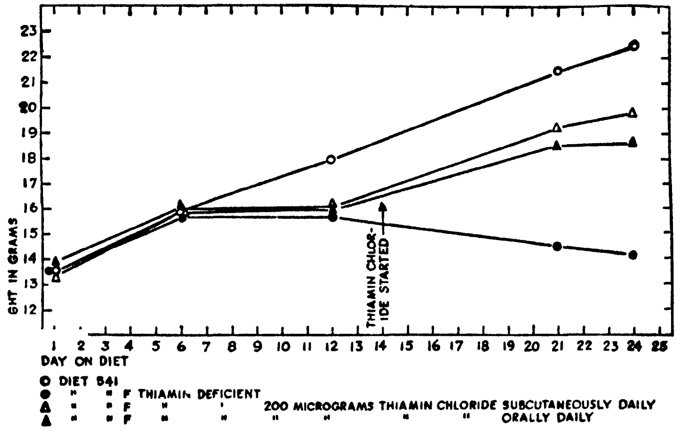

FIGURE 3.—Average rate of growth of male mice in experiment 5.

Summary of experiments 1 to 5.—In the experiments with riboflavin deficiency a total of 140 mice were fed diet 541 and the same number were fed riboflavin deficient diet 541E. Thirty-eight deaths occurred among the 140 mice fed on diet 541. Three deaths occurred by the third day, 10 by the fourth, and 16, or 42 percent, by the fifth day. Of the 72 deaths among the 140 mice fed on riboflavin deficient diet 541E, 27 occurred by the third, 43 by the fourth, and 61, or 84.7 percent of the total deaths, by the fifth day after inoculation with pneumococci. The results are summarized in figure 4.

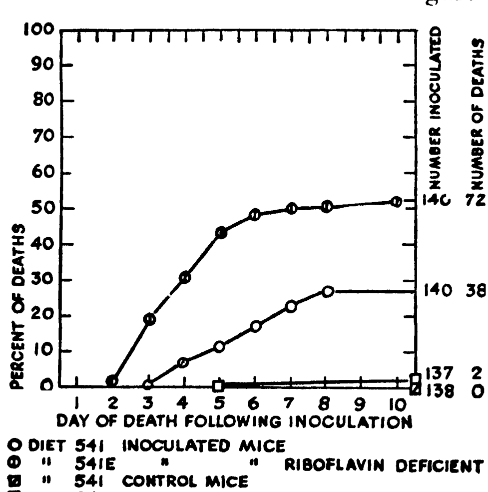

FIGURE 4.—Summary of results with diets 541 and 541E in experiments 1, 2, 3, and 4.

In the experiments with thiamin deficiency a total of 140 mice were fed diet 541 and the same number were fed thiamin deficient diet 541F. Of 32 deaths among the 140 mice fed on diet 541, 6 occurred by the third, 10 by the fourth, and 12, or 37.5 percent, by the fifth day after inoculation with pneumococci. Of the 65 deaths among the 140 mice on thiamin deficient diet 541F, 28 occurred by the third, 42 by the fourth, and 52, or 80 percent, by the fifth day after inoculation with pneumococci. The results are summarized in figure 5.

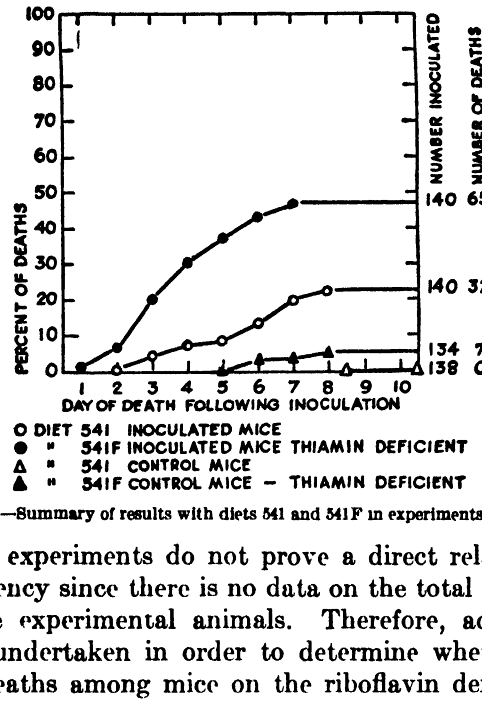

FIGURE 5.—Summary of results with diets 541 and 541F in experiments 1, 2, 3, and 5.

The above experiments do not prove a direct relationship to the specific deficiency since there is no data on the total quantity of food eaten by the experimental animals. Therefore, additional experiments were undertaken in order to determine whether the greater number of deaths among mice on the riboflavin deficient diets was related directly to riboflavin deficiency or to the quantity of food eaten.

Experiment 6.—Four groups of 30 mice each were fed ad lib. Two groups received the control diet 597A and two groups the riboflavin deficient diet 597E, both of the latter being given 200 micrograms of sodium riboflavin daily by subcutaneous injection beginning at the time of inoculation. Four additional groups of 30 mice each were fed equal amounts of diet, two of them receiving the control diet and the remaining two the riboflavin deficient diet. The amount of food allowed these four groups was limited by the quantity eaten daily by the mice on the riboflavin deficient diet. Fifteen days after the beginning of the experiment the mice in one of the groups fed by each of the various methods were inoculated with pneumococci type I, by the intranasal route, and the other groups were inoculated in a similar manner with sterile blood broth as controls.

The smallest number of deaths occurred in each of the two groups that were fed on the control diet 597A. The greatest number of deaths occurred in the group that received the riboflavin deficient diet that was supplemented with 200 micrograms of riboflavin daily by subcutaneous injections beginning at the time of inoculation. The results are summarized in table 7. No deaths occurred among

TABLE 7.—*Results of experiment 6*

INOCULATED WITH PNEUMOCOCCUS TYPE I

Diet	How fed	Days on diet before inoculation	Day of death following inoculation										Remarks
			1	2	3	4	5	6	7	8	9	10	
597A	Ad lib	15	--	1	---	1	1	4	3	2	1	1	14 died. 16 survived.
597E	Ad lib amounts eaten recorded	15	---	1	---	4	5	4	2	1	- -	--	17 died 13 survived.
597A	Amounts equal to 597E	15	--	----	1	---	3	7	----	2	--	-	13 died 17 survived.
597E	Ad lib plus 200 micrograms sodium riboflavin daily after inoculation.	15	---	1	2	1	5	5	5	1	1	-	21 died 9 survived.

the controls. The control mice that were fed riboflavin deficient diet 597E and those that received diet 597A in amounts equal to the average amounts eaten by the former group had weight curves that were practically parallel (fig. 6). Each group lost weight after

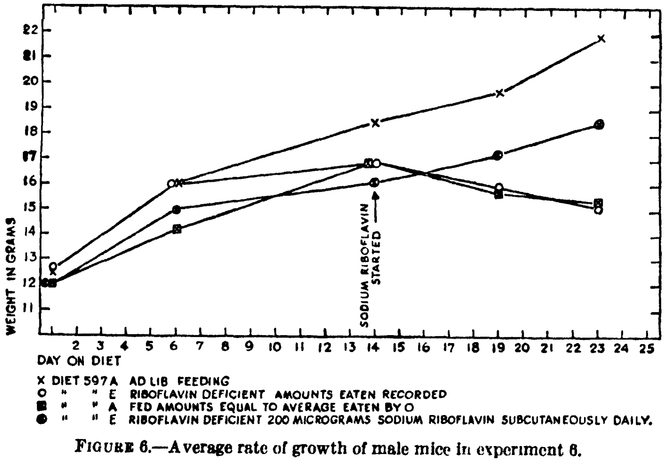

FIGURE 6.—Average rate of growth of male mice in experiment 6.

the second week, whereas the group fed ad lib. on diet 597A continued to show increased weight throughout the period of observation. The group that received riboflavin deficient diet 597E that was supplemented with 200 micrograms of sodium riboflavin daily by subcutaneous injection after 15 days on the diet gained weight throughout the remainder of the period of observation.

PAIRED FEEDING EXPERIMENTS WITH LITTER MATES

Litters of 4 mice of the same sex of approximately equal weight, taken at weaning, were placed in individual one-quarter inch wire mesh cages without bedding so that the diet wasted could be determined and so that the mouse could not have ready access to its feces and urine. Two of the mice were fed diet 597AX and the other two riboflavin deficient diet 597EX. These diets contained twice the amounts of vitamins incorporated in diets 597A and 597E, to prevent multiple vitamin deficiencies when small amounts of food were eaten, except that diet 597EX contained only 0.5 microgram of riboflavin per gram. Each mouse in the litter received the exact amount of diet eaten by the mouse that ate the least during the previous 24 hours. The mouse with the poorest appetite received an excess amount of diet each day. This procedure was followed throughout the period of observation.

After a period of about 2 weeks on the diets, 1 mouse from each litter on each of the two diets was inoculated with pneumococci type I, and the controls with sterile blood broth in the manner previously described. All mice were observed for a period of 10 days. Deaths were recorded and cultures were made in beef infusion broth from the heart blood of the mice dying during this period. Pneumococci were recovered from all of the inoculated mice by this procedure, whereas cultures from the blood of each of the control mice studied remained sterile.

Experiment 7.—Eight litters of male mice and six litters of females were used. Inoculations were made after 14 days on the diet. Following the death of one of the mice of a given litter in this study the litter mates were fed ad lib. There were 3 deaths (1 male and 2 females) in the infected litters on diet 597AX before any of their litter mates. There were 9 deaths (5 males and 4 females) among the infected mice on riboflavin deficient diet 597EX before their corresponding mates. One death occurred among the controls that were fed on diet 597AX before any of the litter mates. A total of 11 of 14 infected mice on riboflavin deficient diet 597EX died during the 10-day observation period. Only 5 infected mice on diet 597AX died during the same time. Two controls on 597AX and 1 on riboflavin deficient diet 597EX died during the period of observation. The results are summarized in table 8.

Experiment 8.—This study was similar to experiment 7. Eight litters of 4 males and nine litters of 4 females were pair fed. Inoculations were made after the mice had been fed for 15 days on the respective diets. Three mice (2 males and 1 female) on diet 597AX died and the litter mates on riboflavin deficient diet 597EX were discarded while 7 (4 males and 3 females) on riboflavin deficient diet 597EX died and their respective litter mates on diet 597AX were discarded. In

four instances the litter mates in the inoculated groups were found dead within a short period of each other (within 3 hours or less). No deaths occurred among the control groups earlier than their inoculated mates.

TABLE 8.—*Total number of deaths in paired feeding of litter mates in experiment 7*

INOCULATED WITH PNEUMOCOCCUS TYPE I

Diet	Days on diet before inoculation	Day of death after inoculation										Remarks
		1	2	3	4	5	6	7	8	9	10	
597 AX	14	-----	-----	1	1	------	1	1	1	------	------	5 died. 9 survived.
597 EX	14	------	1	1	------	3	2	2	1	------	1	11 died. 3 survived.

INOCULATED WITH STERILE BLOOD BROTH

Diet	Days on diet before inoculation	1	2	3	4	5	6	7	8	9	10	Remarks
597 AX	14	------	------	------	------	1	------	-----	-----	1	- ----	2 died. 12 survived.
597 EX	14	------	------	------	------	------	------	------	1	------	-----	1 died. 13 survived.

The results of experiments 7 and 8 indicate that the higher fatality rate in the mice on the riboflavin deficient diets is not due to restricted total food intake.

SUMMARY

It is shown that mice that have been fed diets containing less than minimum requirements of riboflavin or thiamin for normal growth are more susceptible to a fatal infection with pneumococcus type I, when inoculated by the intranasal route, than are mice that have received a diet containing an amount of these vitamins sufficient for good growth. That the increased susceptibility to fatal pneumococcus infection among the mice fed on the riboflavin deficient diets is not due to malnutrition following anorexia was demonstrated in the paired feeding experiments. One experiment showed that there were more deaths in a group of mice on the riboflavin deficient diet when the total food intake was equal to that of a group on a similar diet which contained enough riboflavin for good growth. Also by two paired feeding experiments with litter mates it was again shown that there were more deaths among the mice on the riboflavin deficient diet than in the mice on the good diet during the period of observation.

It was observed that the administration of 100 micrograms of sodium riboflavin daily, beginning at the time of inoculation with pneumococcus type I, to mice that had been fed a diet deficient in this vitamin did not reduce the mortality. When 200 micrograms of sodium riboflavin were administered to 30 riboflavin deficient mice, or 200 micrograms of thiamin hydrochloride to 30 thiamin deficient mice, by subcutaneous injection daily, beginning at the time of inoculation

with pneumococci, the number of deaths was greater than was shown among the respective riboflavin or thiamin deficient infected animals. The number is too small to be significant but the observation is sufficiently interesting to warrant further experimentation.

CONCLUSIONS

1. Under the conditions of these experiments mice deficient in riboflavin or thiamin were more susceptible to a fatal infection with pneumococcus type I when inoculated by the intranasal route than were mice fed on a diet containing enough of these vitamins for good growth.

2. Paired feeding experiments indicate that this effect in the mice on the riboflavin deficient diet is not due to a restricted total food intake.

3. The daily administration of riboflavin or thiamin in amounts 5 to 10 times that in the control diet, to the mice on diets deficient in these substances, respectively, at the time of inoculation with pneumococcus type I, did not reduce the number of animals dying from the infection.

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ON THE ROLE OF PARASITE PIGMENT IN THE MALARIA PAROXYSM[1]

By Dempsie B. Morrison and W. A. D. Anderson

In the course of studies[2] of bile pigment metabolism in dogs following injections of disodium ferrihemate (alkali hematin), attention was drawn to certain similarities between the induced clinical and pathological picture and the symptoms and tissue pathology in malaria. Ferrihemate is exceedingly toxic to dogs, readily causing death in convulsive shock. However, purified ferrihemate may be given repeatedly intravenously, slowly and in controlled amounts, with resultant milder symptoms of toxicity and survival of the animal. In dogs

[1] From the Departments of Chemistry and Pathology, University of Tennessee College of Medicine, Memphis. Received for publication July 23, 1941.

[2] To be published.

killed by ferrihemate administration or sacrificed after long-continued ferrihemate administration, widespread deposition of pigment in the reticulo-endothelial system and extensive plugging of capillaries by pigment or pigment-containing masses resemble strikingly pathological findings in fatal human malaria.

That a causal relationship may exist between pigment liberated by sporulating parasites and the malaria paroxysm has been suggested by others. Brown (*1*) was led to this conclusion by observations of rabbits injected with ferrihemate solutions. Among symptoms noted were shivering, reduction in surface temperature, and elevation in rectal temperature. Brown's solutions were prepared by dissolving hemin crystals, obtained directly from blood by the Schalejew method (*2*), in solutions containing 0.85 percent NaCl and 1.5 to 2.0 percent $NaHCO_3$, and were not of uniform composition. Brown stated, "With different preparations of hematin * * * variations in solubility are continually appearing * * *. Reference is made to this feature of the hematin solution to indicate the difficulty in maintaining absolutely uniform experimental conditions and accurate dosage." Duesberg (*3*) reports that, whereas in man intravenous injection of ferrihemate solutions prepared from once-crystallized hemin (Schalejew method) caused chills and fever, malaria-like symptoms were not observed when recrystallized hemin was used. Bearing also upon the possibility that Brown's findings were determined by nonferrihemate contaminants is Barron's (*4*) observation that reproducible oxidation-reduction potentials can be obtained for solutions of ferrihemate only when the latter is prepared from recrystallized hemin.

Fairley and Bromfield (*5*) have described a brown extracorpuscular pigment in the plasma of a case of blackwater fever. Since spectroscopic tests indicated a similarity to but not identity with methemoglobin, the pigment was named pseudomethemoglobin. Further study indicated that the pigment was a compound of ferrihemate and plasma albumin, and Fairley (*6*) proposed for this compound the name "methemalbumin." Fairley (*7*) now claims, on the basis of the nonspecific Schumm (*8*) test, that ferrihemate may exist in the circulating plasma only in combination with albumin and never in the free state.

Since fever was not a symptom of ferrihemate toxicity in our dogs we have undertaken to extend our observations upon a species of animal (monkey) in which, unlike the dog, experimental malaria may be readily induced by a plasmodium whose intracellular pigment has been identified as ferrihemate (*9*).

EXPERIMENTAL PROCEDURE AND METHODS

Macacus rhesus monkeys were used throughout. Five monkeys received ferrihemate injections; 16 monkeys were infected with

Plasmodium knowlesi (Rockefeller strain[3]); and some 20 normal monkeys served as controls.

The excessive virulence of the original strain of *P. knowlesi* was reduced temporarily by passage through man, and the attenuated strain was used in some animals.

The course of infection was followed in blood smears taken from the tail. The degree of infection was recorded as the percentage of total erythrocytes infected with parasites; in terminal stages this was sometimes as high as 76 percent. Segmentation occurred at approximately 24-hour intervals. By examination of blood films, it was possible from the smears to predict with considerable accuracy when segmentation would occur.

Since we were primarily interested in pigment metabolism, the animals were usually sacrificed when the extent of parasitization was such as to predict early death, and near the time of segmentation when pigment would be present in largest amount. The animals were bled under nembutal anesthesia by cannulation of the femoral artery or, when the animal had collapsed and died or was dying, blood was taken by syringe from the heart. Solid potassium oxalate was used as anticoagulant, and analyses were made as promptly as possible.

Ferrihemate injections.—Disodium ferrihemate (*10*) was prepared by equilibrating an excess of recrystallized hemin with standard NaOH solution. After removal of excess hemin by centrifugation, the saturated ferrihemate solution was diluted with sterile 0.9 percent NaCl to give a final concentration of 160 mg. of ferrihemate per 100 cc. Solutions thus prepared had a pH of approximately 7.6, and were stable and sterile.[4]

The ferrihemate solutions, at a temperature of 28°–30° C., were injected into the saphenous vein at a rate of 0.5 to 1.0 cc. per minute. The amount of ferrihemate given as the disodium salt in a single injection varied from 5.0 to 20.6 mg. per kilo of body weight. The number of injections given to each of the 5 monkeys, the total amounts of ferrihemate administered, time intervals between injections, and other related data are shown in table 1.

Blood analyses.—Blood samples were centrifuged in graduated tubes. After the volumes of cells and plasma were noted, the plasma was removed and reserved. The packed cells were diluted either with 0.9 percent NaCl to original sample volume (method A) or with distilled water to some appropriate volume (method B).

[3] Kindly supplied by Dr L T Coggeshall of the International Health Division of the Rockefeller Foundation Laboratories in the Rockefeller Institute for Medical Research

[4] We are indebted to Dr A D Dulaney, of the Division of Pathology and Bacteriology, for tests of sterility.

TABLE 1.

Animal No.	Weight, kilos	Date of injection	Ferrihemate, mg per kilo	Remarks
		1940		
H-2	4.8	Jan. 26	5 0	
	---- -	Feb. 6	8 35	
	4 5	Feb 18	None	Control injection of 0 9 percent NaCl.
	4 5	Feb 21	12 4	
	4 5	Mar. 13	14 2	
	4 5	Mar. 14	None	Ferrihemate in blood.
	4 5	Apr. 1	None	Killed and autopsied.
H-4	3 6	Feb 14	17 8	
	3 2	Mar. 14	15 0	
	3 2	Apr. 1	None	Killed and autopsied
H-7	3 4	Jan. 25	None	Control injection 0 9 percent NaCl.
	3 4	Feb. 26	18 8	Died 23 minutes after injection.
H 8	3 1	Jan. 29	20 6	Died 30 minutes after injection.
H2-8	3 6	Feb. 13	11 1	
	3 6	Feb 26	17 8	
	3 6	Mar. 11	None	Killed and autopsied.

All spectrographic quantitative analyses of pigments were made with the Bausch & Lomb universal spectrophotometer, with an assembly of cups which permitted readings with the following depths of solutions: 1, 2.5, 5, 10, 20, 50, and 100 mm. When the spectral region to be covered extends from 500 mμ to 700 mμ, as in the present work, the depth of solution must be varied for different wave lengths. Thus, if a solution of hemoglobin is diluted to give optimal readings in the region of maximal absorption (500 mμ to 590 mμ) in a 10 mm. cup, absorption from 600 mμ to 700 mμ is too small for accurate readings. If the same solution is placed in a longer cup, readings in the red are greatly improved. This consideration is of the utmost importance in searching for small amounts of pigment which absorb in the red (methemoglobin, methemalbumin, etc.) which may be mixed with relatively large amounts of oxyhemoglobin.

To simplify the spectrophotometric data all such curves, except H-7-A, figure 1, are calculated for a cup of unit length 1 cm. and for the undiluted blood or urine.

1. Plasma pigments: All plasmas were analyzed spectrophotometrically through the range 500–660 mμ; in some instances the spectral range was extended to 700 mμ. In addition, the plasmas were inspected with a Zeiss direct vision spectroscope for qualitative detection of methemoglobin, methemalbumin, or ferrihemate. Occasional tests for bilirubin were made by the Gibson and Goodrich (*11*) modification of the Van den Bergh method.

2. Parasite pigment: Dilution of packed cells with distilled water (method B) lakes the cells and releases the parasites. The latter swell but do not disintegrate in distilled water. The parasite mass was thrown down and washed repeatedly on the centrifuge with distilled water until hemoglobin or other soluble pigment could no longer be detected by the spectroscope in the wash water.

The pigment of *Plasmodium knowlesi* exists in the parasite as preformed ferrihemate (*9*). Its quantitative determination was done spectrophotometrically on acid-acetone extracts of the washed parasites.[5] Readings may be made at any wavelength but, since the absorption curve shows maxima at 540 mμ and 640 mμ, we have employed the latter band.

Calculations are based upon the following experimentally determined equivalents: An oxyhemoglobin solution equivalent in concentration to 1 millimol per liter of ferrihemic acid and having an oxygen capacity of 1 millimol (22.4 ml.) at S. T. P., when converted to the cyanmethemoglobin derivative and read in a cup of 1 cm. length is characterized by an extinction coefficient of 11.5 at 540 mμ; when the oxyhemoglobin is converted by acid-acetone to ferrihemic acid in equivalent concentration, and read in a cup of 1 cm. length, the extinction coefficient is 5.11 at 640 mμ.

3. Intracellular pigments: Aliquots of suspended cells (method A) or laked cells (method B) were analyzed for total pigment as ferrihemic acid by the acid-acetone method. One volume of cells or blood is added to approximately 23 or 45 volumes of acetone which contains 2 percent by volume of concentrated HCl, and the mixtures are then made up with the acid-acetone to 25 or 50 volumes depending on the pigment values. Globin is precipitated while the heme is converted to ferrihemic acid and remains in solution. The globin is removed by centrifugation in tightly corked tubes, and pigment is determined in the supernatant solution.

The soluble pigments (method B), after the parasites had been removed by centrifugation, were determined spectrophotometrically on aliquots prepared as follows: (*a*) Without further treatment, in which case pigments would be present presumably unaltered; (*b*) after addition of NaF or NaCN for their effect upon absorption by methemoglobin; (*c*) after converting all hemoglobin to cyanmethemoglobin. Comparison of the absorption curves should determine the presence or absence of methemoglobin or soluble ferrihemate. In addition, the several solutions were examined qualitatively with the Zeiss spectroscope for faint bands.

Aliquots of cell suspensions obtained from normal control animals were analyzed for hemoglobin by the oxygen capacity method (*13*), by the spectrophotometric-cyanmethemoglobin method (*14*), and by the acid-acetone method. Since it is valid to assume that hemoglobin is the only pigment of normal erythrocytes, these determinations served to establish the equivalents employed in calculating pigment concentration from observed extinction coefficients of acid-acetone solutions of ferrihemic acid.

[5] This method is adapted from a procedure used by one of us in a study of the influence of pH upon the dissociation of hemoglobin (*12*).

Since, with the possible exception of animal M–10, the only *soluble* pigment present in detectable amounts in parasitized blood was hemoglobin, it is possible to calculate from total pigment and hemoglobin values the percentage of hemoglobin which had been converted to parasite pigment.

Tissue analyses.—Total pigment was determined in the spleen of one ferrihemate-injected monkey and in the spleens of two malarial monkeys. The tissues were ground with sand, extracted with acid-acetone, and the extract analysed spectrophotometrically in the usual manner.

Urine analyses.—Urines of malarial animals were examined for hemoglobin; when this was present it was determined spectrophotometrically. Upon the urines of all animals the following routine observations were made: Specific gravity, reaction to litmus, reducing sugars, proteins, bile pigments, urobilogen, and, occasionally, ether soluble porphyrins.

Although the animals were kept in individual steel metabolism cages, with wire mesh bottoms above stainless steel collecting pans, accurate collection of urines was complicated by the animals' habit of throwing water with their hands from the drinking cups.

RESULTS

FERRIHEMATE-INJECTED MONKEYS

Symptoms.—Injection of ferrihemate in unanesthesized monkeys at first stimulates respiration and heart rate slightly. Surface capillaries contract; face, ears, axilla, groins, gums, and tongue blanch; later, these regions may become slightly cyanotic. As more ferrihemate is given, the face and ears especially and the nose become tan in color, the animal licks his lips, and frequently vomit contractions appear. Respiration may become labored and abdominal in type. Lacrimation and salivation may occur. Rectal temperature may rise or fall. Some animals exhibit a very marked nystagmus.

With the higher dosage, symptoms of weakness and shock appear. If the injection is stopped and the animal returned to its cage signs of vertigo, weakness, and lassitude are manifest for some time. Usually recovery appears to be complete within 1 or 2 hours, although in one animal a very pronounced edema around the eyes persisted for 24 hours.

Two animals which received the larger dosages of ferrihemate, after the usual preliminary symptoms, rapidly became convulsive, collapsed, and died a few minutes later. Although respiration had ceased, the heart, on exposure, was found to be still beating. In monkey H–7, the heart, while fibrillating, still had a slow and relatively strong beat. Visceral organs were congested with blood.

Blood picture.—In figure 1, curves H–7 and H–8 describe the pigment in the plasmas of 2 monkeys which were killed by ferrihemate injections. A slight hemolysis in monkey H–7 is revealed by peaks at 540 mμ and 577 mμ. When these curves are compared with those representing plasmas of malaria-infected monkeys (fig. 2), it is evident that no appreciable amount of soluble pigment is found in the plasma of parasitized blood.

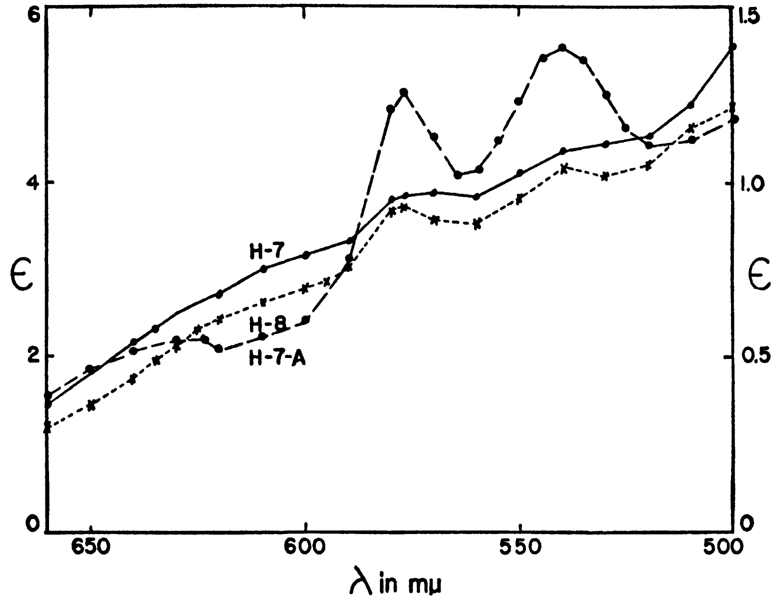

FIGURE 1.—Spectrophotometric curves of plasmas of monkeys H-7 and H-8 injected with disodium ferrihemate. Curve H-7-A is that of a pigment which may be methemalbumin. Read curves H-7 and H-8 against scale to the left and curve H-7-A to the right.

Curve H–7–A, figure 1, is that of a sparingly soluble pigment obtained after removal of plasma from a sample of blood of monkey H–7 and laking the cells with distilled water. After centrifuging and decanting the hemoglobin solution, a small amount of brownish residue was ground in distilled water to give a suspension which was again centrifuged. Thus was obtained an apparent solution or colloidal dispersion upon which curve H–7–A was determined. Since this curve exhibits a peak at approximately 625 mμ, it may represent Fairley's (*6*) methemalbumin contaminated with oxyhemoglobin.

Animal H–2 was injected with 14.2 mg. of disodium ferrihemate per kilo of body weight in the afternoon and a sample of blood was taken the following morning. When this blood was centrifuged, a thin band of greyish color collected between the red and white cell layers. This band had the appearance of a layer of parasitized erythrocytes. Microscopic examination of a smear of the material of

the band demonstrated that it was composed mainly of leucocytes containing phagocytized pigment.

Spleen.—Monkey H-2-8 was injected on February 13 with 11.1 mg., and on February 26 with 17.8 mg., of ferrihemate per kilo of body weight. On March 11, the animal was killed and the spleen analyzed for total pigment. The relatively small weight of spleen and low concentration of pigment are to be compared (table 2) with the findings in malaria-infected monkeys.

Other tissues.—Microscopic findings at autopsy [6] of all ferrihemate-injected animals disclosed that the pigment had precipitated and occluded smaller vessels and capillaries. It is suggested that observed clinical symptoms are related, at least in part, to such occlusions which, when occurring in a vital location, cause death. In our experience with monkeys and a much larger series of dogs, if an animal survives an injection for approximately 30 to 45 minutes it will survive indefinitely.

MALARIA-INFECTED MONKEYS

Symptoms.—The general clinical picture develops as follows: Approximately 5 to 7 days after intramuscular inoculation of the animal with blood containing *Plasmodium knowlesi*, the first parasitized erythrocytes may be demonstrated in thick smear. Within the next 24 hours 6 to 8 percent of red cells are parasitized. As segmentation is repeated there is a progressive increase in the number of parasitized erythrocytes. In some animals the extent of parasitization of red cells has reached 76 percent. Hemoglobin falls rapidly and cell volume diminishes as the infection progresses. Near the terminal stage, anemia is so severe that blood for smear may be obtained from the tail only with difficulty.

Only in terminal stages, when anemia is very severe, is there significant curtailment of activity. Near or at the time of last segmentation symptoms of vertigo, uneven respiration, and elevated temperature (to 104.8° F.) are observed. The animals may walk unsteadily, but just before death they tend to lie on the abdomen with face in hands. If removed from the cage at this time, however, they still are capable of remarkable activity. Death comes suddenly with failure of respiration before the heart stops. In our series, death occurred, regardless of degree of infection, only when the cell volume had fallen to 10 percent or less and hemoglobin below 25 percent of normal.

In the several animals which were inoculated with *P. knowlesi* after human passage, the infection did not reach as high levels of parasitization as in animals receiving the nonattenuated strain. However, the characteristic anemia developed progressively, and the animals died

[6] A detailed report will be published of gross and microscopic findings at autopsy of ferrihemate-injected and malaria infected animals

about 6 days after initial appearance of parasites in the peripheral blood, as compared with 3 or 4 days for the more virulent strain.

Blood picture.—Figure 2 presents spectrophotometric analyses of plasmas of 4 normal and 6 malaria-infected monkeys. Curves 1, 2, and 3 represent infected monkeys M–4, M–9, and M–10, respectively, and demonstrate a very marked hemoglobinemia (as noted below, hemoglobinuria was also observed in these animals).

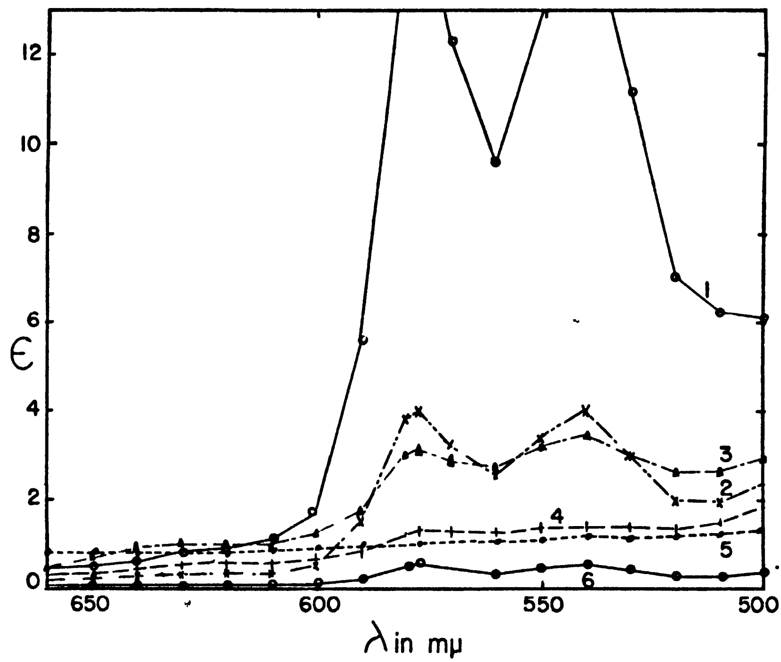

FIGURE 2.—Spectrophotometric curves of plasmas of normal and infected monkeys. Curves 1, 2 and 3 are of infected monkeys M–4, M–9, and M–10, respectively, and these animals showed a pronounced hemoglobinuria. Curve 4 is a composite of the curves of 3 infected animals which showed a slight hemoglobinemia and no hemoglobinuria. Curve 6 is the composite curve for 4 normal monkeys. Curve 5 describes a suspension of finely ground malarial parasites in distilled water.

It is to be emphasized that the optical clarity of plasmas from malaria-infected monkeys varies considerably, and may be correlated with the time of segmentation. If the blood sample is taken just before segmentation, when the parasites are largely mature but before rupture of the erythrocytes, the plasma has reasonably good optical quality. If segmentation has occurred and the plasma is loaded with very small parasite masses, satisfactory optical clarity cannot be obtained even with prolonged centrifuging.

We believe that turbidity, due to such semicolloidal parasite material, is responsible for absorption in the region of 630 mμ of curve 3 (monkey M–10), which is otherwise suggestive of methemoglobin. With the hand spectroscope no absorption at this wave length could be detected.

Curve 4 is a composite of individual analyses of plasmas of malarial animals M–1, M–6, and M–8. No appreciable hemoglobinemia is seen in these three cases. However, the plasmas had about the same turbidity as in animal M–10, and exhibit comparable absorption in the red.

Control curve 6 is the average of four plasmas obtained from normal animals with technique comparable to that employed in drawing blood from parasitized animals.

Curve 5 represents the supernatant centrifugate of a finely ground suspension of hemoglobin-free parasites in distilled water.

Comparison of spectrophotometric curves (fig. 3) of water soluble pigments present after removal of parasites from laked cell mixtures

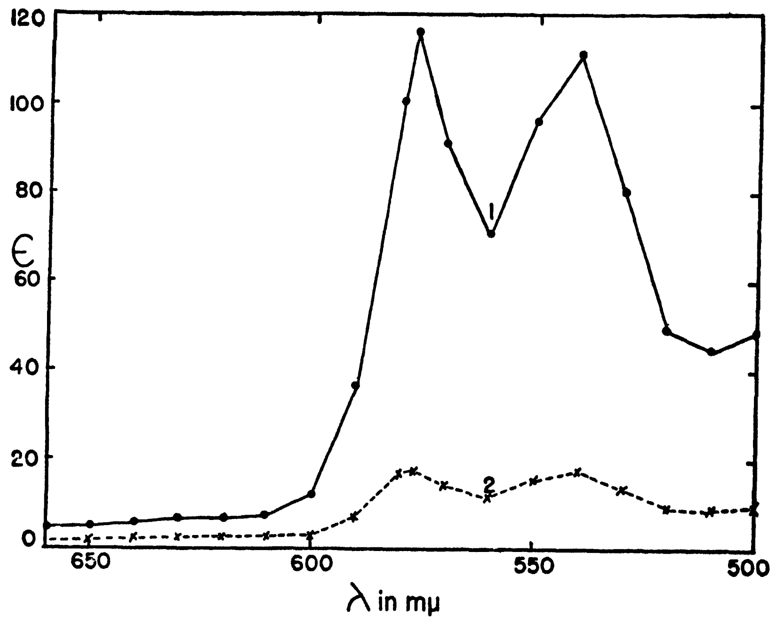

FIGURE 3.—Spectrophotometric curves of the soluble erythrocyte pigment (oxyhemoglobin) of 11 normal monkeys, curve 1, and of 6 malaria-infected animals, curve 2. The curves are calculated for a 1 cm. cup and for the undiluted blood.

(method B) indicates that the only soluble pigment was hemoglobin. Slight absorption in the red can again be accounted for by turbidity due to parasite material which could not be removed by centrifugation. Curve 1, figure 3, is the composite oxyhemoglobin curve for the 11 normal monkeys, and is to be contrasted with curve 2, the composite oxyhemoglobin curve for the six infected animals. Comparison of these two curves (cf., also, figs. 4 and 5) emphasizes the profound anemia which characterizes *P. knowlesi* infection in the monkey. It may be noted, in this connection, that no significant increases in plasma bilirubin could be detected in the six infected animals studied.

The relative amount of pigment circulating as parasite pigment in comparison to total pigment (hemoglobin-heme plus parasite ferrihemate), may vary from practically none to as much as 42 percent,

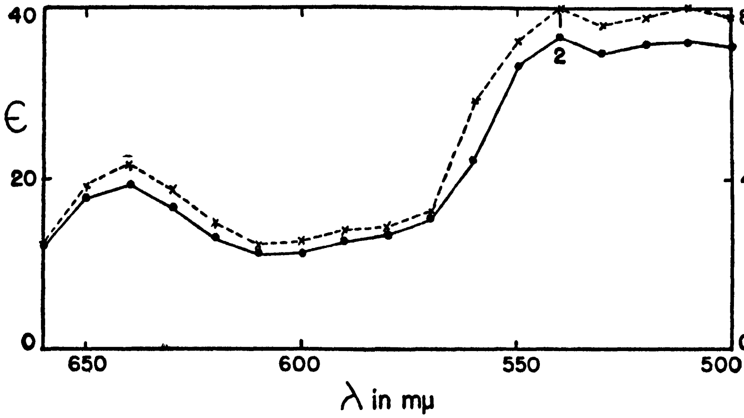

FIGURE 4.—Spectrophotometric curves for the total ferrihemic acid in acid acetone obtained from hemoglobin and parasites (curve 2) of monkey M-4 and for the ferrihemic acid obtained from the hemoglobin free parasites (curve 1). Curves are calculated for a 1 cm cup and for the undiluted blood. Read curve 2 against scale to the left and curve 1 against scale to right.

depending upon degree of parasitization and the stage of the parasite cycle. In figure 4, curve 2 represents the total pigment (as ferrihemate) of infected monkey M-4, and curve 1, the parasite pigment. From these curves it may be calculated that 22 percent of the total circulating pigment is parasite pigment.

In figure 5 are shown the progressive fall in hemoglobin and its relation to total circulating pigment in a heavily infected monkey

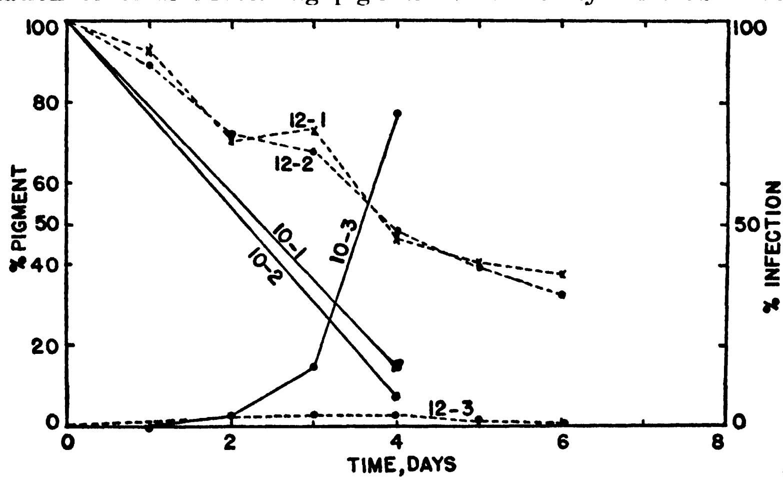

FIGURE 5.—Comparison of the total pigment and hemoglobins with degree of infection of animals M-10 and M-12. Curves 10-1 and 12-1 represent total ferrihemic acid expressed as percent of the normal for these animals. Curves 10-2 and 12-2 are the hemoglobin values in percent of the normal. Curves 10-3 and 12-3 are the percent of erythrocytes infected with parasites. Read curves 1 and 2 against the scale to the left and curve 3 to the right.

(M-10), which survived for 4 days after parasites were first demonstrated in the blood, and a monkey (M-12) with milder infection which was sacrificed on the sixth day.

Spleen.—The data of table 2 illustrate the relatively large increase in size and weight of spleen (infected monkeys M-16 and M-18) when gorged with parasites, and the tremendous concentration of parasite pigment in this organ. Such spleens are under so much pressure that they tend to round up; when slit open in the long axis their contents bulge outward. They contain practically no hemoglobin, and what little fluid may be expressed resembles plasma more than whole blood.

TABLE 2.

Animal No.	Weight, kilos	Weight spleen, gm.	Ferrihemate, mg per 100 gm. spleen
H2-8	3 4	5 5	47
M-16	2 0	15 0	495
M-18	2 5	21 0	526

Urine picture.—Collections were made of 237 specimens of urine from normal and malaria-infected monkeys. Of these, 174 samples were not contaminated with food and 61 percent were alkaline to litmus. In approximately 100 urines which were not contaminated and probably not diluted by water thrown from drinking cups, the specific gravity ranged from 1.005 to 1.032 with the majority between 1.010 and 1.022. Urobilinogen, bile pigment, and ether-soluble porphyrins varied from negative to traces and could not be related to the course or extent of infection. Reducing sugars were absent. Protein was found only at the terminal stage of infection in some animals and was always associated with and probably identical with hemoglobin.

In figure 6, curves M-9 and M-10 represent spectrophotometric analyses of undiluted urine specimens taken from the bladders of 2 of 3 malaria-infected monkeys which had exhibited pronounced hemoglobinuria. Since in the plasmas of these 2 monkeys it had not been possible to demonstrate a significant concentration of methemoglobin (fig. 2, curves 2 and 3), it is obvious that a considerable conversion of hemoglobin to methemoglobin has occurred during or after excretion. That such conversion occurs, particularly in acid urine, is well known. It may be noted that both urines here described were acid in reaction to litmus.

DISCUSSION

The essentially normal urine picture, with only occasional hemoglobinuria, in malaria-infected monkeys is to be credited, we believe, to the rapid course of infection with *P. knowlesi*. Erythrocytes are dehemoglobinized by the invading parasite and, at segmentation, the

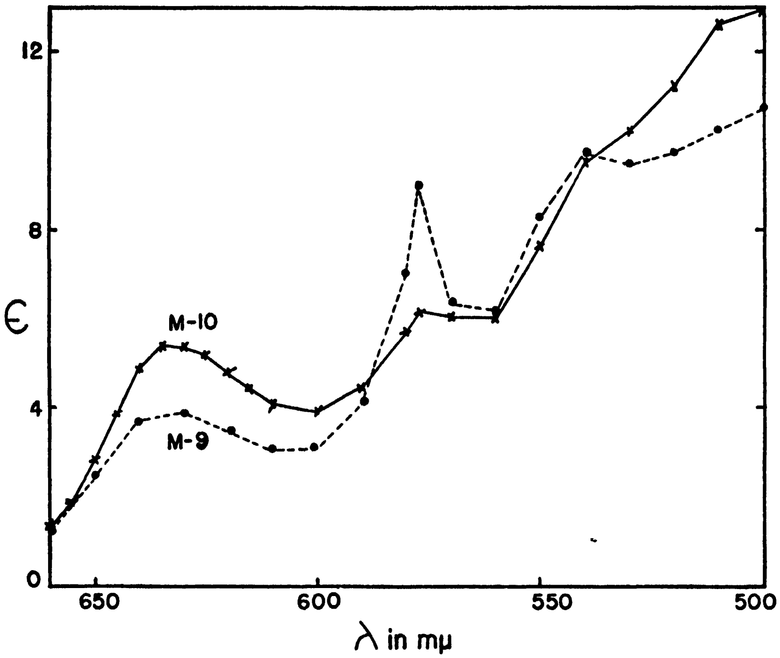

FIGURE 6.—Spectrophotometric curves of the undiluted bladder urines of infected animals M-9 and M-10 Calculated for the undiluted urine in a cup of 1 cm Note the severe hemoglobinuria and methemoglobinuria.

end product of parasite pigment metabolism, ferrihemate, is enclosed within the parasite and not liberated in soluble form in significant amounts within the circulation. These pigment-loaded parasites are rapidly phagocytized by the reticulo-endothelial system.[7] Blocking and congestion of capillaries with parasites may well be imagined to cause intravascular damage and hemorrhage and thus account for hemoglobinemia and hemoglobinuria.

Since hemoglobin is a renal threshold substance, hemoglobinuria following a paroxysm is determined by the degree of hemoglobinemia. Thus, in figure 1, curves 1, 2, and 3 represent animals which exhibited definite hemoglobinuria coincident with the significant hemoglobinemia, whereas the 3 animals represented in composite curve 4 did not have hemoglobin in the urine at the lower level of hemoglobinemia indicated.

In view of our findings with ferrihemate-injected monkeys and dogs, and the observations of Brown (*1*) we have been somewhat surprised to find little, if any, ferrihemate in soluble form in the circulation of malaria-infected monkeys. We can discover in our present work no evidence of causal relationship between symptoms of malaria toxicity and parasite pigment *per se*. In our animals, toxic manifestations

[7] See footnote 6.

appeared only when a severe anemia had developed and the reticulo-endothelial system had been overwhelmed by accumulation of parasites.

SUMMARY

1. There are important differences between the symptoms of ferrihemate intoxication and malaria infection in the monkey.

2. Ferrihemate-injected monkeys die in shock with the exhibition of symptoms suggestive of capillary blocking in vital organs, or recover very rapidly and completely after a brief interval of acute toxic reaction.

3. Ferrihemate is not a causative agent in the malaria paroxysm of monkeys since the pigment is not liberated in soluble form from the parasite.

ACKNOWLEDGMENT

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DEATHS DURING WEEK ENDED JANUARY 17, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Jan. 17, 1942	Corresponding week, 1941
Data from 87 large cities of the United States		
Total deaths	9,594	9,604
Average for 3 prior years	9,248	
Total deaths, 2 weeks	19,292	19,325
Deaths per 1,000 population, 2 weeks, annual rate	13.6	13.6
Deaths under 1 year of age	593	541
Average for 3 prior years	536	
Deaths under 1 year of age, 2 weeks	1,204	1,103
Data from industrial insurance companies:		
Policies in force	64,887,805	64,741,173
Number of death claims	13,432	13,875
Death claims per 1,000 policies in force, annual rate	10.8	11.2
Death claims per 1,000 policies, 2 weeks, annual rate	10.1	10.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JANUARY 24, 1942

Summary

Of the nine communicable diseases included in the weekly reports and for which comparable figures are available for earlier years, only measles, poliomyelitis, and whooping cough were above the 5-year (1937–41) median during the current week, and the incidence of these diseases was only slightly above the median expectancy.

The incidence of influenza continued low, with no evidence of a Nation-wide epidemic. A total of 4,332 cases was reported as compared with 3,894 for the preceding week, 91,203 for the corresponding week last year, and a 5-year (1937–41) median of 13,242 cases. In recent weeks the incidence of influenza has been constantly highest in a few of the South Atlantic and South Central States, which areas reported about 84 percent of the cases for the current week. Texas, where the disease has been mildly epidemic since the summer of last year, reported 1,553 cases for the current week; South Carolina, 653; Alabama, 433; and Virginia, 362. Only 6 other States reported 100 or more cases.

Ten States reported a total of 20 cases of smallpox (as compared with a 5-year median of 278 cases), and 89 cases of typhoid fever were reported, as compared with a median expectancy of 109 cases. Two cases of anthrax were reported (1 each in New Jersey and Pennsylvania), 19 cases of amebic dysentery (7 in California and 4 in Illinois), 72 cases of bacillary dysentery (59 in Texas), and 32 cases of tularemia. Fifty-one cases of endemic typhus fever were reported, all in the South Atlantic and South Central States.

The crude death rate for the week for 88 large cities in the United States was 13.0 per 1,000 population, as compared with 13.5 for the preceding week and 13.6 for the 3-year (1939–41) average. The accumulated rate for the first 3 weeks of 1942 is 13.4 as compared with 14.0 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended January 24, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Jan 24, 1942	Jan 25, 1941		Jan 24, 1942	Jan 25, 1941		Jan 24, 1942	Jan 25, 1941		Jan 24, 1942	Jan 25, 1941	
NEW ENG												
Maine	0	0	4	---	1,138	34	261	34	96	1	0	0
New Hampshire	0	0	0	--	44		7	15	15	0	0	0
Vermont	0	0	0	-	23		10	38	22	0	0	0
Massachusetts	3	3	4				284	341	341	1	0	1
Rhode Island	1	0	0	1	29		88	2	2	0	1	0
Connecticut	2	1	3	2	1,869	13	143	21	164	0	0	0
MID ATL.												
New York	20	18	28	[1] 11	[1] 522	[1] 37	346	2,125	400	3	4	5
New Jersey	8	22	15	10	377	32	167	688	467	2	1	1
Pennsylvania	17	6	36			-	1,214	2,485	131	3	4	8
E NO CEN.												
Ohio	7	8	29	29	3,245	21	96	770	39	2	2	2
Indiana	8	11	20	14	432	28	67	126	16	0	2	2
Illinois	24	14	33	34	171	79	104	1,210	45	1	0	0
Michigan [2]	15	4	9	5	412	12	176	1,199	511	0	0	1
Wisconsin	3	1	1	20	230	64	179	286	286	0	3	1
W NO CEN.												
Minnesota	1	3	3	2	954	8	326	7	25	1	0	0
Iowa	3	5	5	1	671	22	62	109	78	0	0	0
Missouri	8	3	14	12	147	147	82	26	13	0	2	1
North Dakota	2	3	2	14	141	42	80	13	6	0	0	0
South Dakota	6	9	0		5	4	6	39	5	0	0	0
Nebraska	0	4	3		34		43	2	5	0	0	0
Kansas	2	1	7	17	750	142	135	223	213	1	1	0
SO ATL												
Delaware	3	1	1		392		7	20	8	1	1	0
Maryland [2]	7	5	7	6	624	132	243	25	25	2	1	2
Dist of Col	3	1	4	3	168	19	17	5	5	1	0	0
Virginia	8	6	21	362	12 868	282	195	304	188	4	2	2
West Virginia	11	8	14	38	13 565	56	190	54	26	1	2	3
North Carolina	17	24	24	31	1,277	62	777	87	87	1	2	2
South Carolina	6	8	10	653	11 731	865	154	25	11	1	1	1
Georgia	10	2	11	101	9 031	470	130	63	52	0	0	0
Florida	9	1	8	8	216	50	49	6	33	1	1	1
E SO CEN												
Kentucky [2]	7	8	10	21	2,450	59	38	164	73	1	2	4
Tennessee	5	5	13	81	3 528	325	111	42	47	1	2	2
Alabama	20	5	13	433	7,043	399	72	81	81	2	2	2
Mississippi	8	2	6				--	--	-	0	1	1
W SO CEN												
Arkansas	[3] 3	12	12	[3] 186	2,633	651	[3] 175	63	19	0	2	1
Louisiana	11	4	15	8	660	42	24	1	4	2	0	0
Oklahoma	10	9	9	138	1,521	373	183	5	5	0	1	1
Texas	71	23	44	1,553	7,830	2,158	1 097	102	195	9	3	0
MOUNTAIN												
Montana	0	3	0	9	721	33	54	3	3	0	0	0
Idaho	5	0	0		79	2	22	0	60	0	0	0
Wyoming	0	2	0	70	616		13	2	2	0	0	0
Colorado	6	1	7	77	603	27	190	57	57	0	0	0
New Mexico	0	0	0		159	21	53	84	49	1	0	1
Arizona	2	4	6	100	528	271	201	106	10	0	1	0
Utah [2]	0	3	1	105	155	45	38	16	29	0	0	0
Nevada	0	0	- -	-	-- -	--	0	0		0	0	----
PACIFIC												
Washington	0	2	2	12	110	13	35	82	82	2	1	1
Oregon	1	0	2	53	125	125	116	223	22	0	1	1
California	16	17	24	112	1,376	1,376	1,621	83	110	7	2	1
Total	369	272	574	4 332	91 203	13 242	9 681	11 462	9 284	52	48	52
3 weeks	1,127	919	1,888	12,026	294,168	34,741	25,839	32,697	25,811	165	147	155

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended January 24, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Jan. 24, 1942	Jan. 25, 1941		Jan. 24, 1942	Jan. 25, 1941		Jan 24, 1942	Jan. 25, 1941		Jan 24, 1942	Jan 25, 1941	
NEW ENG.												
Maine	0	0	0	26	5	17	0	0	0	0	1	1
New Hampshire	0	0	0	12	4	8	0	0	0	0	0	0
Vermont	0	0	0	7	11	11	0	0	0	0	0	0
Massachusetts	0	0	0	374	149	195	0	0	0	6	1	1
Rhode Island	0	0	0	33	4	8	0	0	0	0	0	0
Connecticut	0	0	0	38	39	75	0	0	0	0	1	1
MID. ATL.												
New York	2	2	1	350	440	584	0	0	0	6	2	5
New Jersey	2	0	0	112	269	146	0	0	0	0	0	0
Pennsylvania	8	2	0	278	283	500	0	0	0	6	2	6
E. NO. CEN.												
Ohio	3	1	2	320	247	300	0	0	3	4	1	2
Indiana	0	0	0	107	157	189	3	2	7	1	3	1
Illinois	2	2	1	265	410	489	2	0	21	2	8	7
Michigan [2]	8	4	0	399	187	574	0	4	0	1	2	2
Wisconsin	1	2	0	166	147	204	0	2	12	0	0	0
W. NO. CEN.												
Minnesota	0	0	0	106	56	139	2	3	13	0		0
Iowa	0	5	1	63	56	140	0	7	12	1	4	1
Missouri	1	0	0	86	91	174	3	6	18	0	1	1
North Dakota	1	0	0	44	3	21	1	0	2	0	0	0
South Dakota	1	0	0	49	29	26	0	0	0	0	0	0
Nebraska	0	0	0	38	20	36	1	0	0	0	0	0
Kansas	0	1	1	79	64	151	2	2	8	0	0	0
SO. ATL.												
Delaware	0	0	0	62	13	13	0	0	0	0	0	0
Maryland [2]	0	0	0	68	83	62	0	0	0	4	2	3
Dist. of Col	0	0	0	15	11	15	0	0	0	0	0	1
Virginia	0	0	0	52	50	50	0	0	0	3	2	3
West Virginia	0	0	0	91	33	60	0	0	0	1	2	1
North Carolina	2	1	0	53	46	46	0	0	0	1	0	1
South Carolina	0	1	1	14	6	7	0	0	0	1	0	2
Georgia	0	3	2	17	25	19	0	0	0	3	1	3
Florida	0	2	0	3	1	6	0	0	0	4	0	0
E. SO. CEN.												
Kentucky [2]	0	4	1	114	66	66	0	0	0	1	7	2
Tennessee	0	0	0	78	93	47	0	1	1	2	5	2
Alabama	1	0	1	37	19	18	0	0	0	4	3	3
Mississippi	0	0	0	13	7	7	0	2	1	0	2	1
W. SO. CEN.												
Arkansas	0	0	0	11	8	9	0	0	2	5	1	3
Louisiana	2	2	0	5	10	18	0	0	0	13	1	5
Oklahoma	0	0	1	15	27	43	0	0	0	2	3	2
Texas	1	1	1	82	54	97	4	2	5	10	0	10
MOUNTAIN												
Montana	0	0	0	20	24	30	0	0	3	0	1	1
Idaho	0	0	0	15	14	24	1	0	8	1	0	2
Wyoming	0	0	0	7	8	8	0	0	1	0	0	0
Colorado	0	0	0	24	29	36	0	12	8	1	2	0
New Mexico	0	0	0	2	6	23	0	2	1	0	2	2
Arizona	0	0	0	8	5	10	0	0	0	0	0	0
Utah [3]	1	1	0	35	6	28	0	0	0	0	0	0
Nevada	0	0	-----	0	0	-----	0	0	----	0	3	-----
PACIFIC												
Washington	1	1	1	32	27	61	1	1	1	2	2	0
Oregon	0	0	1	19	12	46	0	0	5	1	0	0
California	1	2	1	128	112	221	0	1	10	3	1	5
Total	28	37	24	3,981	3,466	5,492	20	47	278	89	67	109
3 weeks	85	103	71	10,374	10,004	15,238	41	152	869	243	232	329

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended January 24, 1942,—Continued

Division and State	Whooping cough, week ended—		Week ended Jan. 24, 1942								
			Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Jan. 24, 1942	Jan 25, 1941		Amebic	Bacillary	Unspecified					
NEW ENG.											
Maine	52	18	0	0	0	0	0	0	0	0	0
New Hampshire	5	0	0	0	0	0	0	0	0	0	0
Vermont	33	17	0	0	0	0	0	0	0	0	0
Massachusetts	296	250	0	0	0	0	0	0	0	0	0
Rhode Island	92	6	0	0	0	0	0	0	0	0	0
Connecticut	135	89	0	0	3	0	0	0	0	0	0
MID. ATL.											
New York	578	351	0	0	0	0	0	0	0	0	0
New Jersey	257	126	1	0	0	0	0	0	0	0	0
Pennsylvania	330	494	1	0	0	0	0	0	0	0	0
E. NO. CEN.											
Ohio	306	332	0	1	0	0	0	0	0	1	0
Indiana	52	22	0	0	0	0	0	0	0	0	0
Illinois	286	108	0	4	1	0	0	0	1	1	0
Michigan [2]	434	331	0	1	1	0	0	0	0	0	0
Wisconsin	364	149	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	27	49	0	0	0	0	0	0	0	1	0
Iowa	28	15	0	0	0	0	0	0	0	1	0
Missouri	11	42	0	0	0	0	0	0	0	0	0
North Dakota	21	32	0	0	0	0	1	0	0	0	0
South Dakota	5	3	0	0	0	0	0	0	0	0	0
Nebraska	9	2	0	0	0	0	0	0	0	0	0
Kansas	61	93	0	0	0	0	0	0	0	1	0
SO. ATL.											
Delaware	0	21	0	0	0	0	0	0	0	0	0
Maryland [2]	41	87	0	0	0	1	0	0	0	2	0
Dist. of Col.	26	7	0	0	0	0	0	0	0	0	0
Virginia	45	128	0	1	0	28	0	0	0	1	0
West Virginia	79	55	0	0	0	0	0	0	0	0	0
North Carolina	250	218	0	0	0	0	0	0	0	2	2
South Carolina	41	120	0	0	0	0	0	0	0	3	4
Georgia	16	26	0	1	5	0	0	0	0	4	12
Florida	27	7	0	0	0	0	0	0	0	0	2
E. SO. CEN.											
Kentucky [2]	94	46	0	0	1	0	0	0	0	5	0
Tennessee	18	64	0	1	0	1	0	0	0	7	0
Alabama	9	26	0	0	0	0	0	0	0	0	10
Mississippi	-----	-----	0	0	0	0	0	0	0	1	0
W. SO. CEN.											
Arkansas	14	24	0	1	0	0	0	0	0	0	0
Louisiana	1	7	0	0	0	0	0	0	0	0	5
Oklahoma	13	20	0	0	0	0	0	0	0	0	0
Texas	92	249	0	2	59	0	0	0	0	0	16
MOUNTAIN											
Montana	16	15	0	0	0	0	1	0	0	0	0
Idaho	8	18	0	0	0	0	0	0	0	1	0
Wyoming	0	0	0	0	0	0	0	0	0	1	0
Colorado	41	34	0	0	0	0	0	0	0	0	0
New Mexico	50	39	0	0	0	0	1	0	0	0	0
Arizona	54	10	0	0	0	7	0	0	0	0	0
Utah [2]	54	57	0	0	0	0	0	0	0	0	0
Nevada	2	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	169	96	0	0	0	0	0	0	0	0	0
Oregon	54	16	0	0	0	0	0	0	0	0	0
California	222	318	0	7	2	0	1	0	0	0	0
Total	4,818	4,237	2	19	72	37	4	0	1	32	51
3 weeks	12,546	13,561	-----	-----	-----	-----	-----	-----	-----	-----	-----

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Inclusive of delayed reports as follows: Diphtheria, 1; influenza, 21; measles, 1; scarlet fever, 4.

WEEKLY REPORTS FROM CITIES

City reports for week ended January 10, 1942

This table lists the reports from 88 cities of more than 10,000 population distributed throughout the United States and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza, Cases	Influenza, Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Atlanta Ga	1	0	8	2	5	0	3	0	10	0	0	0
Baltimore Md	3	0	8	3	218	2	21	0	15	0	0	9
Barre Vt	0	0		0	1	0	0	0	1	0	0	0
Billings, Mont	0	0		0	0	0	1	0	1	0	0	0
Birmingham Ala	0	0	1	1	0	0	6	0	4	0	0	1
Boise Idaho	0	0		0	0	0	0	0	0	0	0	0
Boston Mass	2	0		0	59	2	12	0	100	0	0	35
Bridgeport, Conn	0	0		1	2	0	1	0	1	0	0	2
Brunswick Ga	0	0		0	4	0	0	0	0	0	0	0
Buffalo, N Y	0	0		0	1	0	6	0	22	0	1	12
Camden N J	0	0		0	4	0	2	0	2	0	0	10
Charleston, S C	0	0	34	2	0	0	9	0	1	0	0	2
Charleston W Va	0	0	1	0	2	0	3	0	1	0	0	0
Chicago Ill	23	0	7	2	14	0	38	0	94	0	0	84
Cincinnati, Ohio	0	0	0	2	0	0	7	0	20	0	0	29
Cleveland, Ohio	1	0	20	2	7	1	20	0	43	0	0	34
Columbus Ohio	0	0		0	5	0	3	0	2	0	0	3
Concord N H	0	0		0	0	0	0	0	3	0	0	0
Cumberland Md	0	0		0	2	0	0	0	0	0	0	0
Dallas, Tex	5	0	2	1	52	0	1	0	6	0	0	3
Denver Colo	6	0	42	0	42	0	[illegible]	0	3	1	0	11
Detroit Mich	5	0	1	2	[illegible]	0	[illegible]	1	82	0	0	47
Duluth Minn	0	0		0	3	0	[illegible]	0	6	0	0	1
Fall River Mass	0	0		0	0	0	0	0	27	0	0	2
Fargo N Dak	0	0		0	0	0	1	0	0	0	0	0
Flint Mich	0	0		0	0	0	5	0	1	0	0	5
Fort Wayne Ind	0	0		0	0	0	3	0	1	0	0	0
Frederick Md	0	0		0	0	0	0	0	0	0	0	0
Galveston Tex	1	0		0	1	0	0	0	2	0	0	0
Grand Rapids Mich	0	0		0	11	0	1	0	4	0	0	7
Great Falls Mont	0	0		0	25	0	1	0	1	0	0	6
Hartford Conn	0	0		1	0	0	1	0	1	0	0	2
Helena Mont	0	0		0	0	0	0	0	0	0	0	4
Houston Tex	5	0		0	2	0	15	0	8	0	2	0
Indianapolis Ind	0	0		0	6	0	8	0	7	0	0	22
Kansas City, Mo	0	0		0	5	0	2	0	10	0	0	4
Kenosha Wis	0	0		0	2	0	0	0	2	0	0	5
Little Rock Ark	0	0	8	0	6	0	1	0	0	0	0	2
Los Angeles Calif	4	0	38	1	31	1	15	0	15	0	0	17
Lynchburg Va	0	0		0	0	0	1	0	1	0	0	0
Memphis Tenn	0	0	12	4	2	0	1	0	3	0	0	8
Milwaukee, Wis	0	0		0	12	2	0	0	25	0	0	80
Minneapolis, Minn	1	0		0	3	0	4	0	13	0	0	0
Missoula, Mont	0	0		0	0	0	0	0	0	0	0	5
Mobile, Ala	0	1		1	8	0	2	0	0	0	0	0

City reports for week ended January 10, 1942—Continued

	Diphtheria cases	Encephalitis, infectious cases	Influenza		Measles cases	Meningitis, meningococcus cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Nashville, Tenn.	0	0	---	1	1	0	3	0	3	0	0	1
Newark, N. J	0	0	10	1	48	2	5	1	17	0	0	20
New Haven, Conn	0	0	------	0	43	0	1	0	2	0	0	5
New Orleans, La	0	0	1	1	1	0	20	0	4	0	2	1
New York, N. Y.	15	1	8	2	28	5	84	0	159	0	2	330
Omaha, Nebr	1	0	------	0	2	0	4	0	0	0	0	1
Philadelphia, Pa	7	0	2	1	12	1	24	0	97	0	0	65
Pittsburgh, Pa	1	0	2	0	15	1	11	0	12	0	0	8
Portland, Maine	0	0	------	0	2	0	6	0	11	0	0	2
Providence, R. I.	1	0	-----	0	10	0	5	0	9	0	0	47
Pueblo, Colo	0	0	-----	0	129	0	1	0	2	0	0	0
Racine, Wis	0	0	-----	0	13	0	0	0	1	0	0	10
Reading, Pa	0	0	--	0	4	0	1	0	0	0	0	4
Richmond, Va	0	0	2	2	0	0	4	0	2	0	1	0
Roanoke, Va	0	0	------	0	1	0	0	0	0	0	0	0
Rochester, N. Y	0	0	----	0	4	0	2	0	5	0	0	14
Sacramento, Calif	1	0	----	0	87	0	2	0	8	0	0	2
Saint Joseph, Mo	0	0		0	3	0	6	0	1	0	0	0
Saint Louis, Mo	0	0	2	2	15	0	14	0	16	0	0	9
Saint Paul, Minn	0	1	---	0	119	0	1	0	3	0	0	13
San Antonio, Tex	1	0	9	2	1	0	9	0	0	0	0	7
San Francisco, Calif	0	0	3	0	9	1	10	0	4	0	0	2
Savannah, Ga	0	0	7	1	34	0	2	0	2	0	0	1
Seattle, Wash	0	0	----	0	0	0	4	0	1	0	0	17
Shreveport, La	3	0	---	7	1	0	3	0	0	0	0	0
South Bend, Ind	0	0	----	0	1	0	2	0	5	0	0	0
Spokane, Wash	0	0	----	0	4	0	2	0	6	0	0	12
Springfield, Ill	2	0	----	0	0	0	1	0	1	0	0	1
Springfield, Mass	0	0	---	0	15	0	6	0	15	0	0	41
Superior, Wis	0	0	----	0	1	0	0	1	0	0	0	10
Syracuse, N Y	0	0	----	0	1	0	2	0	2	0	0	37
Tacoma, Wash	0	0	--	0	0	0	3	0	3	0	0	2
Tampa, Fla	0	0	1	1	0	0	2	0	0	0	0	1
Terre Haute, Ind	0	0	------	0	0	0	1	0	0	0	0	0
Topeka, Kans	0	0	----	0	2	0	0	0	6	0	0	6
Trenton, N J	0	0	3	0	0	0	3	0	4	0	0	7
Washington, D C	0	0	6	0	5	0	13	0	14	0	0	38
Wheeling, W Va	0	0	---	0	49	0	1	0	4	0	0	0
Wichita, Kans	0	0	1	1	15	0	3	0	7	0	0	5
Wilmington, Del	1	0	------	0	1	0	6	0	19	0	0	0
Wilmington, N C	0	0	------	0	68	0	2	0	0	0	0	1
Winston-Salem, N C	1	0	----	0	36	0	1	0	6	0	0	0
Worcester, Mass.	0	0	------	0	1	0	5	0	20	0	0	24

Rates (annual basis) per 100,000 population for a group of 88 selected cities (population, 1941, 33,774,582)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Jan 10, 1942	14 00	36.77	7 23	206 47	75 54	156 01	0.15	1 23	184 01
Average for week, 1937–41	20 65	337 59	17 55	323 45	122 36	193 17	4 04	3 11	165 07

FOREIGN REPORTS

BRITISH EAST AFRICA

Tanganyika Territory—Cerebrospinal meningitis.—Cerebrospinal meningitis has been reported in Tanganyika Territory, British East Africa, by weeks, as follows:

Week ended—	Cases	Deaths	Week ended—	Cases	Deaths
1941			1941		
Oct 4	153	9	Nov 1	134	20
Oct 11	255	35	Nov 8	328	175
Oct 18	192	36	Nov 15	76	11
Oct 25	225	31	Nov 22	101	29

NOTE —See also PUBLIC HEALTH REPORTS for Dec 19, 1941, p 2442

CANADA

Provinces—Communicable diseases—Week ended December 27, 1941.—During the week ended December 27, 1941, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				4	6	1			3	14
Chickenpox				136	288	69	109	36	49	687
Diphtheria		27		15	4	6	1		3	56
Dysentery				3	2					5
Influenza		3			3	7			54	67
Measles		2		437	51	67	40	9	16	622
Mumps		4	1	288	189	55	31	25	72	665
Pneumonia		1			6	3			12	22
Poliomyelitis		1						1		2
Scarlet fever		13	10	118	217	16	12	31	11	428
Trachoma						1				1
Tuberculosis			3	91	31	24		1		150
Typhoid and paratyphoid fever				12		3				15
Whooping cough		5	1	44	56	5		2	16	129

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates

Place		January-October 1941	November 1941	December 1941—week ended—			
				6	13	20	27
ASIA							
Afghanistan: Southern Province.[1]							
Ceylon	C	3					
China:							
Canton	C	464					
Hong Kong	C	1,659					
Macao	C	1,411	62	2			
Shanghai	C	812	22				
India	C	87,896					
Bombay	C	15					
Calcutta	C	2,069	50				
Rangoon	C	116					
India (French)	C	34					
Japan: Taiwan	C	2					

[1] During the week ended Dec. 6, 1941, cholera was reported present in Southern Province, Afghanistan.

PLAGUE

[C indicates cases; P, present]

Place		January-October 1941	November 1941	December 1941—week ended— 6	13	20	27
AFRICA							
Belgian Congo	C	[1] 39					
British East Africa:							
Kenya	C	589	97				
Tanganyika Territory	C	2					
Uganda	C	153	26				
Egypt: Port Said	C	10					
Madagascar	C	229	19				[2] 37
Morocco	C	2,127	45	15	5	5	4
Casablanca[3]	C	4	3				
Tunisia: Tunis	C	2					
Union of South Africa	C	71	2				
ASIA							
China:							
Fukien Province[4]							
Foochow	C	3					
Dutch East Indies:							
Java and Madura	C	459					
West Java	C	344					
India	C	3,975					
Calcutta	C	3					
Rangoon	C	9			P		
Indochina (French)	C	24	1				
Palestine: Haifa	C	10	1				
Plague-infected rats	C	25					
Thailand: Lampang Province	C	3					
EUROPE							
Portugal: Azores Islands	C	2		1			
NORTH AMERICA							
Canada—Alberta—Plague-infected ground squirrel		1					
SOUTH AMERICA							
Argentina:							
Cordoba Province	C	[5] 21				P	
Loberia	C					2	
Santa Fe Province—Plague-infected rats		67					

[1] Includes 21 cases of pneumonic plague.
[2] For the month of December.
[3] A report dated June 23, 1941, stated that an outbreak of plague had occurred in Casablanca, Morocco, where several deaths had been reported.
[4] A report dated Nov. 22, 1941, stated that bubonic plague had appeared in epidemic form in Shaowu and Yangkow, Fukien Province.
[5] Includes 3 cases of pneumonic plague.

PLAGUE—Continued

Place		January-October 1941	November 1941	December 1941—week ended—			
				6	13	20	27
SOUTH AMERICA—continued							
Brazil.							
Alagoas State	C	86					
Bahia State	C	10					
Pernambuco State	C	70					
Rio de Janeiro State	C	2					
Chile: Valparaiso	C	1					
Ecuador	C	33					
Peru:							
Ancash Department	C	1	9				
Lambayeque Department	C	3					
Libertad Department	C	7	4				
Lima Department	C	15	2				
Moquegua Department—Ilo	C	7					
Piura Department	C	2	8				
OCEANIA							
Hawaii Territory:[4] Plague-infected rats		55	8				
New Caledonia	C	9	2				

[4] During April and May, 4 lots of plague-infected fleas were also reported in Hawaii Territory.

SMALLPOX

[C indicates cases]

Place		January-October 1941	November 1941	December 1941—week ended—			
				6	13	20	27
AFRICA							
Algeria	C	548	199				
Angola	C	[1] 29					
Belgian Congo	C	673					
British East Africa	C	30	42				
Dahomey	C	467					
French Guinea	C	45					
Gold Coast	C	312					
Ivory Coast	C	40					
Morocco [2]	C	648					
Nigeria	C	901					
Niger Territory	C	267					
Portuguese East Africa	C	9					
Rhodesia: Southern	C	86					
Senegal	C	65					
Sierra Leone	C	15					
Sudan (Anglo-Egyptian)	C	7					
Sudan (French)	C	19					
Union of South Africa	C	758					
ASIA							
Ceylon	C	114					
China	C	256	3				
Chosen	C	696					
Dutch East Indies—Bali Island	C	3					
India	C	23,928					
India (French)	C	9					
India (Portuguese)	C	70					
Indochina (French)	C	1,123	45				[4] 117
Iran	C	8					
Iraq	C	1,252	165				
Japan	C	200					
Straits Settlements	C	1					
Syria	C	1					
Thailand	C	303					
EUROPE							
France	C	1					
Portugal	C	39	2		2		
Spain	C	351	67	11	7		
Switzerland	C		1				
NORTH AMERICA							
Canada	C	25					
Dominican Republic	C	2					
Guatemala	C	5	1				
Mexico	C	317					
Panama Canal Zone (alastrim)	C	[3] 1					

[1] For June.

[2] A report dated Dec. 31, 1941, stated that an epidemic of smallpox had occurred near Casablanca, Morocco, where about 100 cases per week were reported.

[3] For September.

[4] For December.

SMALLPOX—Continued

Place		January–October 1941	November 1941	December 1941—week ended—			
				6	13	20	27
SOUTH AMERICA							
Bolivia	C	[5] 18					
Brazil	C	[6] 1					
Colombia	C	716		2			
Paraguay	C	[5] 8					
Peru	C	778					
Uruguay	C	7					
Venezuela (alastrim)	C	229	2				

[5] For January, February, and March.
[6] For August.

TYPHUS FEVER

[C indicates cases]

Place		January–October 1941	November 1941	December 1941—week ended—			
				6	13	20	27
AFRICA							
Algeria	C	10,083	667				
British East Africa. Kenya	C	6	4				
Egypt	C	8,632					
Morocco [1]	C	909	140		67	102	121
Sierra Leone	C	5					
Tunisia	C	5,114	926	180	168		275
Union of South Africa	C	438	15				
ASIA							
China	C	245					
Chosen	C	425					
Dutch East Indies. Sumatra	C	136					
India	C	4					
Iran	C	105					
Iraq	C	50	3				
Japan	C	864					
Malaya. Unfederated States	C	1					
Palestine	C	108	47				
Straits Settlements	C	7	1				
Trans-Jordan	C	9					
EUROPE							
Bulgaria	C	227	3	1		4	24
France (unoccupied zone)	C	2					
Germany	C	1,771	119		27		
Gibraltar	C	2					
Greece	C	7					
Hungary	C	433	8				[5] 31
Irish Free State	C	26					
Poland	C	960					
Portugal	C	5					
Rumania	C	792	327		234	171	189
Spain	C	9,175	102	31	39		
Switzerland	C	5					
Turkey	C	645					
Yugoslavia	C	78					
NORTH AMERICA							
Guatemala	C	168	13				
Mexico	C	171					
Panama Canal Zone	C	3					
Puerto Rico	C	8	2			1	1
SOUTH AMERICA							
Bolivia	C	[2] 75					
Brazil	C	1					
Chile	C	[3] 276					
Colombia	C	1					
Ecuador	C	119					
Peru	C	[4] 1,079					
Venezuela	C	47	11				
OCEANIA							
Australia	C	12					
Hawaii Territory	C	47	9	3			

[1] Information dated Dec. 31, 1941, reports typhus fever present in epidemic form in Casablanca, Morocco.
[2] For January, February, and March.
[3] Jan 1 to Aug 3, 1941.
[4] January to June inclusive.
[5] For December.

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January-October 1941	November 1941	December 1941—week ended—			
				6	13	20	27
AFRICA							
Belgian Congo:							
Aba	C				[1] 2		
Kimvulu	C	1					
Libonge	C	1					
Stanleyville	D		[1] 1				
British East Africa: Uganda	C	1					
Dahomey: Grand-Popo	C					[1] 2	
French Equatorial Africa:							
Gabon	C	2					
Mayumba	C	4					
French Guinea	C		[2] 3				
French West Africa	C		5				
Gold Coast	C	2	[1] 1				
Accra	C	1					
Ivory Coast [4]	C	[3] 7		[1] 1			
Nigeria	C	[1] 1					
Spanish Guinea	D	4					
Sudan (French)	C		[5] 10	[1] 1			
SOUTH AMERICA [6]							
Brazil:							
Amazonas State	D	4					
Bahia State	D	2					
Para State	D	8					
Colombia:							
Antioquia Department	D	2	1				
Boyaca Department	D	8					
Intendencia of Meta	D	8	5				
Santander Department	D	17	2				
Tolima Department	D	1					
Peru: Junin Department	C	5					
Venezuela: Bolivar State	C	1					

[1] Suspected.
[2] Includes 1 suspected case.
[3] Includes 2 suspected cases.
[4] During the week ended Jan. 10, 1942, 1 suspected case of yellow fever was reported in Azaguie, Ivory Coast.
[5] Includes 4 suspected cases.
[6] All yellow fever reported in South America is of the jungle type unless otherwise specified.

COURT DECISION ON PUBLIC HEALTH [1]

Payment for services performed by superintendent of county board of health.—(South Dakota Supreme Court; *Donahoe* v. *Minnehaha County*, 299 N.W. 238; decided July 3, 1941.) An action was brought by the plaintiff to recover for services performed by him as superintendent of a county board of health. The county had disallowed claims of the plaintiff based upon the making of routine examinations of school houses throughout the county. The judgment of the trial court was in favor of the defendant county and the plaintiff appealed to the supreme court.

The latter court referred to a statute which provided that a county board of health "shall have original power to inquire into sanitary conditions of school houses within the county, and upon complaint

[1] Through inadvertence only a partial abstract of this decision was published in Public Health Reports, Nov. 7, 1941, pp. 2187–2188. A complete abstract appears herein.

and investigation shall have power to abate any insanitary condition that may be found to exist." "In order," said the court, "that 'original power' may be exercised there must be some action by the board itself. * * * Clearly the superintendent must receive some authority from the board of which he is a member before the investigations and services are rendered." It was pointed out that the record disclosed that none of the items for which the plaintiff sought recovery was authorized or directed to be done at any meeting of the county board of health and that there had been no authorization or direction by the board or anyone to incur the services, mileage, and expenses. Also, the record was silent as to the report of any immediate emergency. On account of the foregoing, the court did not believe that the plaintiff's claims should be allowed.

However, it was urged that, under another statutory provision, the action of the county board of health as such was not necessary and that the superintendent was entitled to his pay if he acted under the rules and regulations adopted by the State board of health. This statute provided that for each investigation, visit, or examination necessarily made under the provisions of the rules and regulations of the State board of health the superintendent of the county board of health should receive $5. The rule of the State board upon which the plaintiff relied read: "When it shall come to the attention of the health officer by complaint or otherwise that a school premises be in an insanitary condition, and he finds that existing conditions warrant, he shall forthwith order that the place be closed and kept closed until it has been repaired and properly disinfected or cleansed, or both, as the case may require." The appellate court said that it was convinced that the routine examinations of the school premises made by the plaintiff did not come within the meaning of the above quoted regulation of the State board. No complaint had been made to the plaintiff regarding the insanitary condition of any school, and the examinations were not made because he had been in any way advised that any school was in an insanitary condition. "It is clear under the evidence in this case that insanitary conditions in any school house in the county had not come to the attention of the appellant but that the examinations he made were routine examinations not based upon any belief that insanitary conditions actually existed." The court was, therefore, of the opinion that it need not decide the contention that the State board of health by regulation could compel the superintendent of the county board of health to act and that when he did act under such regulation without the sanction of the county board there was a liability incurred by the county for such acts.

The judgment of the trial court was affirmed.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E R COFFEY, *Assistant Surgeon General, Chief of Division*

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Public Health Reports

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NUTRITION SURVEY OF POPULATION GROUPS[1]

REPORT OF A CONFERENCE ON METHODS AND PROCEDURES[2]

INTRODUCTION

Recent advances in our knowledge of nutrition have stimulated great interest in the application of this newer knowledge in the field of public health. Two circumstances in particular have emphasized the place of nutrition in public health and the need to include services in nutrition in public health practice. These are (1) the growing recognition of the frequency of mild or early nutritional deficiencies in the general population, and (2) the development of methods and procedures for detecting them. The rapid progress, however, has left some doubt and uncertainty regarding the suitability and reliability of the procedures and tests which are used for the detection and identification of dietary deficiencies. Confronted with the necessity of incorporating work in nutrition in public health practice. administrators and directors of public health services have felt the need of assistance and advice from those who have had special experience in this field in determining what procedures, methods, and tests are established as suitable and reliable for use in surveys and assessments of nutrition. For this reason, at the suggestion and request of The Rockefeller Foundation, a number of those who have had special experience in this field, and have made a special study of some of the problems, met for the purpose of discussing the various tests and procedures and selecting those on which general agreement could be reached regarding their suitability and reliability for use in public health practice.

Many factors and circumstances had to be taken into consideration in the discussions, and must be taken into account in any consideration of the conclusions which were reached. To begin with, the pur-

1 From the International Health Division of The Rockefeller Foundation.

2 Members of the conference, which was held at Atlantic City, N. J., October 18, 1941, were Dr. John B. Youmans, Nashville, Tenn.; Dr. N. Jolliffe, New York City; Dr. W. H. Sebrell, Washington, D C.; Dr. H. D. Kruse, New York City; Dr. E. W. McHenry, Toronto, Canada; Dr. V. P. Sydenstricker, Augusta, Ga.; Dr. D F. Milam, Chapel Hill, N. C.; Dr. E. W. Patton, Nashville, Tenn.; and Dr. W. D. Robinson, Ann Arbor, Mich. The group elected Dr. Youmans chairman and Dr. Jolliffe secretary.

Observers included Dr. J. N. Baker, Montgomery, Ala.; Dr. G. C. Payne, Mexico City, Mexico; Dr. W. A. McIntosh, New York City; and Dr. J. A. Ferrell, New York City.

pose for which these tests and procedures are to be used, namely, for mass surveys of populations or groups of the population, must be kept in mind and distinguished from their use in clinical practice or experimental investigation. Secondly, the conclusions reached are valid only for the present and until later and additional discoveries make necessary a revision. In view of the rapid progress now under way, this may be expected to be soon. Thirdly, the discussions deal with surveys of nutrition of a general type, namely, those in which as many as possible of the various nutritive factors are studied. Surveys for special and limited purposes may alter the conditions and circumstances. Fourthly, it must be kept in mind that the value of a method does not depend on the amount of deficiency found by that method, providing the method is adequate to detect the deficiency. The fact that a given deficiency does not exist in a group may be as important as that it is present in 20 percent of the subjects. However, the inclusion or exclusion of an established, acceptable method may be decided on the basis of the probable incidence of a deficiency so detected, though in general it will be unwise to omit accepted methods in general surveys unless a previous survey has been made or a pilot survey run.

It will be seen that the number of procedures and tests which have received general acceptance is small. This is the result of the attempt to designate as acceptable and established only those tests which received general agreement as to their suitability and reliability after a careful consideration of all the factors involved. It should not be taken to mean that other tests should not be used in surveys of nutrition. Many others may be used and in fact should be used in order that they may be studied and their value established. Even now there are other tests which some workers believe are useful and reliable means of detecting a particular deficiency but which have not as yet received sufficient trial and study to warrant a decision as to their acceptability.

The results of the discussions have been condensed in the general form of opinions and recommendations. These are given below and carry the endorsement of the entire group. Obviously their value is only such as derives from the experience and judgment of the members of the conference.

DIETARY STUDIES

Dietary surveys.—It was the opinion of the group that diet and food consumption records are an essential part of surveys of nutrition. They should preferably consist of food inventory and purchase records on a family basis and/or individual records of food consumption, both covering a period of a week. The individual records are particularly indicated for comparison with the individual examination.

Calculation of data obtained by diet studies and records.—In order

that surveys by different groups of workers may be more satisfactorily compared, it is recommended that common tables be used in the calculation of the nutritive composition of foods. To make this possible the group recommends that the Nutrition Division of Defense, Health, Welfare and Related Services be asked to prepare from existing data working tables giving the nutritional composition of foods. Such tables should give acceptable mean values for calculation of the data, as well as an indication of the variability of the values.

Nutritive requirements.—It is recommended that the standard of reference for nutritive requirements be the National Research Council's Committee on Food and Nutrition's Table of Recommended Daily Allowances.

CLINICAL EXAMINATION

Medical history.— It is recommended that a complete medical history with emphasis on food habits, intercurrent illness, and symptoms which may be of nutritional origin be obtained, together with a complete physical examination.

Physical examination.—The examination should be of the character recommended by the Food and Nutrition Committee of the National Research Council, which follows:

TENTATIVE CLINICAL CRITERIA FOR THE RECOGNITION OR SUSPICION OF EARLY NUTRITIONAL FAILURE IN INFANTS AND CHILDREN AND IN ADOLESCENTS AND ADULTS

Implicit in the definition of the problem and in the foregoing statements is the fact that no symptoms or physical sign can be accepted as diagnostic of early nutritional failure. Certain symptoms and physical signs, however, when verified by a competent physician and when other possible causes have been ruled out, should be considered as significant indications.

A. Symptoms and signs suggestive of early deficiency states in infants and children

Symptoms		Physical signs	
1. Lack of appetite	(L)	1. Lack of sub-skin fat	(L)
2. Failure to eat adequate breakfast	(L)	2. Wrinkling of skin on light stroking	(N)
3. Failure to gain steadily in weight	(L)	3. Poor muscle tone	(D)
4. Late period of sitting, standing, walking	(L)	4. Pallor	(L)
5. Aversion to normal play	(L)	5. Rough skin (toad skin)	(N)
6. Chronic diarrhea	(L)	6. Hemorrhage of newborn (K)	(L)
7. Inability to sit	(L)	7. Bad posture	(N)
8. Pain on sitting and standing	(L)	8. Nasal blackheads and whiteheads	(N)
9. Poor sleeping habits	(L)	9. Sores at angles of mouth	(L)
10. Backwardness in school	(L)	10. Rapid heart	(N)
11. Repeated respiratory infections	(L)	11. Red tongue	(N)
12. Photophobia	(L)	12. Square head, wrists enlarged, rib beading	(N)

Symbols: L=suitable for laymen, teachers, etc.; N=suitable for nurses; D=suitable for physicians only.

Symptoms—Continued

13. Lacrimation (L)

Physical signs—Continued

13. Vincent's angina, thrush (N)
14. Serious dental abnormalities (N)
15. Corneal and conjunctival changes—slit lamp (D)

B. Symptoms and signs suggestive of early deficiency states in adolescents and adults which may exist in absence of underweight or other evidence of undernourishment

Symptoms

1. Lack of appetite (L)
2. Lassitude and chronic fatigue (L)
3. Loss of weight (L)
4. Lack of mental application (L)
5. Loss of strength (L)
6. History of sore mouth or tongue (L)
7. Chronic diarrhea (L)
8. Nervousness and irritability (L)
9. Paresthesias (L)
10. Night blindness (N)
11. Photophobia (L)
12. Burning or itching of eyes (L)
13. Lacrimation (L)
14. Muscle and joint pains, muscle cramps (L)
15. Sore bleeding gums (L)
16. Tendency to bleed (L)

Physical signs

1. Nasolabial sebaceous plugs (N)
2. Cheilosis (N)
3. Vincent's angina (D)
4. Minimal changes in color or texture of tongue (D)
5. Red, swollen lingual papillae (D)
6. Glossitis (N)
7. Papillary atrophy of tongue (D)
8. Stomatitis (D)
9. Spongy bleeding gums (L)
10. Muscle tenderness, extremities (D)
11. Poor muscle tone (D)
12. Loss of vibratory sensation (D)
13. Increase or decrease of tendon reflexes (D)
14. Hyperesthesia of skin (D)
15. Bilateral symmetrical dermatitis (D)
16. Purpura (L)
17. Dermatitis; facial butterfly, Casel's necklace, perineal, scrotal, vulval (N)
18. Thickening and pigmentation of skin over bony prominences (D)
19 Nonspecific vaginitis (D)
20. Follicular hyperkeratosis of extensor surfaces of extremities (D)
21. Rachitic chest deformity (D)
22. Anemia not responding to iron (D)
23. Fatigue of accommodation (D)
24. Vascularization of cornea (D)
25. Conjunctival changes (D)

Symbols L=suitable for laymen, teachers, etc., N=suitable for nurses, D=suitable for physicians only.

SPECIAL TESTS IN THE ASSESSMENT OF NUTRITION OF POPULATIONS

VITAMIN A

Adaptometry.—Adaptometry is not yet an established method suitable for detection of vitamin A deficiency in population groups.

Blood vitamin A and blood carotene.—These determinations are technically workable and give information on the current vitamin A status, but their complete significance remains to be established.

Conjunctival changes.—Conjunctival changes detectable grossly and/or by the slit lamp may offer significant information as to the vitamin A status. It is recommended that they be studied and recorded in surveys of population groups.

THIAMIN

Determinations of thiamin in body fluids by the fermentation and thiochrome methods are technically satisfactory, but their use in surveys for detection of thiamin deficiency on population groups is not feasible.

NICOTINIC ACID

Neither the chemical nor the microbiologic methods for determination of nicotinic acid can yet be considered feasible for use in detection of nicotinic acid deficiency in population groups. No other established laboratory methods are as yet available.

RIBOFLAVIN

Both the chemical and the microbiologic methods are satisfactory for the determination of riboflavin, but their application for the detection of riboflavin deficiency in population groups is not established.

Slit lamp and biomicroscopic examination for capillary invasion of the cornea.—Characteristic capillary invasion of the cornea is an index of riboflavin deficiency, and it is recommended that this examination be used in group assessments of the nutritional status.

VITAMIN C

Plasma ascorbic acid determination is a reliable index of vitamin C sub-nutrition. It appears to be established that plasma levels below 0.6 milligrams indicate an unsatisfactory state of vitamin C nutrition.

VITAMIN D, CALCIUM, PHOSPHORUS

X-ray in the diagnosis of rickets.—The X-ray is an established method for the diagnosis of active and healing rickets at a stage when it cannot be detected by physical examination.

X-ray in diagnosis of demineralization.—The X-ray, even with use of the densitometer, is not an acceptable method as yet for detection of less than moderate grades of demineralization.

Serum phosphatase and phosphorus determinations are acceptable laboratory methods for the detection of early rickets and may be used in studies of population groups.

Serum calcium determinations.—The determination is technically satisfactory, but its usefulness in population groups is limited.

VITAMIN K DEFICIENCY

Methods for the detection of prothrombin deficiency are technically satisfactory, but the determination would have little or no usefulness in nutritional surveys, except in special groups such as expectant mothers.

ANEMIA

Routine hemoglobin determinations by a reliable method (such as by photoelectric colorimetry) should be done on all subjects in a survey group. Red blood cell counts and packed cell volumes should be determined when indicated.

PROTEIN

Serum albumin determinations by the Kjeldahl (macro or micro) or by the biuret methods are technically satisfactory, the former being somewhat more accurate. This determination should be made in studies of population groups, especially those in whom protein deficiency is suspected.

ANTHROPOMETRIC MEASUREMENTS

Special anthropometric measurements are not recommended for studies in general population groups.

SUMMARY

To summarize the discussion of this group it may be said that an assessment of the nutritional status of a population can be done at present by conducting, on a suitable sample, a properly planned dietary and food intake survey, together with an adequate physical and medical examination, the latter to include a slit-lamp examination of the eyes and the securing of blood samples for the determination of hemoglobin, plasma ascorbic acid concentration, and the concentration of blood serum or plasma albumin. While it is recognized that appraisal on this basis will give only partial information, more complete studies must await the development of additional methods.

THE PRESENT STATUS OF FULL-TIME LOCAL HEALTH ORGANIZATION [1]

By F. W. KRATZ, *Surgeon, United States Public Health Service*

The level of health organization in the Nation as a whole is frequently gauged by the number of counties having full-time local health service. This method is subject to some criticism in that it does not take into account localities served by independent municipal health units. Nevertheless, since the county is by far the predominant type of administrative unit employed for local health services, a Nationwide survey of counties affords a legitimate means of over-all evaluation.

Full-time local public health service is a comparatively recent development. Almost all such services now in existence were estab-

[1] From the States Relations Division.

lished within the last 25 years, and considerably more than half of them within the last 6 years. In 1915 there were in the entire country only 14 counties with full-time local service. From 1915 to 1935 there was a gradual but steady increase in the number of counties with such service, until at the end of the latter year 762 counties were served by full-time local units. Passage of the Social Security Act in 1935 stimulated and accelerated this development until on June 30, 1940, there were 1,577 counties under full-time local service. During the year ended June 30, 1941, full-time service was extended to 92 more counties, bringing the total to 1,669, or 54 percent of the 3,070 counties within the boundaries of the continental United States.

The accompanying map (fig. 1) indicates the geographical distribution of full-time local health services in the United States on June 30, 1941. It also indicates the distribution of such services according to types of administrative unit. The three types of units shown are (1) the single-county unit, (2) the local-district unit comprising two or more counties under local administration, and (3) the State-district unit comprising two or more counties under the centralized administration of the State health department.

Of the 1,669 counties with full-time service on June 30, 1941, 663 or 40 percent, were served by single-county units, 426, or 25 percent, by local-district units, and 580, or 35 percent, by State-district units.

In addition to the 1,669 counties with full-time service, there were on June 30, 1941, 103 cities with full-time municipal health units whose budgets were reported to the Public Health Service The combined population of the 1,669 counties and 103 cities represented approximately 70 percent of the total population of the 48 States and the District of Columbia.

In recent years, the ratio of counties with the single-county unit type of organization to the total number of counties served by full-time units has undergone a marked decline. Conversely, the percentages of counties provided with service under local-district and State-district forms of organization have increased (see table 1).

TABLE 1.—*Ratio of counties with each type of full-time local health service to total number of counties with full-time local service*

Type of unit	December 31, 1935		June 30, 1941	
	Counties served	Percent of total	Counties served	Percent of total
Single-county unit	486	64	663	40
Local-district unit	124	16	426	25
State district unit	152	20	580	35
Total	762	100	1,669	100

It is probable that the trend toward a multiple-county rather than a single-county form of organization will continue. The areas remaining unorganized are chiefly those in which population is relatively sparse and in which local resources are limited.[3] A multiple-county unit is, for obvious reasons, likely to be an advantageous form of organization in such areas.

Since June 30, 1941, the organization of full-time local services has been completed in several additional counties, notably in hitherto unorganized regions which have assumed importance as military or war-industry concentration points. The chief impetus to this development has been the Public Health Service emergency health and sanitation program which has made personnel available for service in these areas. Between June 30 and December 1, 1941, full-time service was established in 30 counties in 9 States. Of these 30 counties, 15 were provided with single-county units and 15 either formed new local-district units or were incorporated into existing local-district units.

Negotiations are now being carried on for the establishment of full-time service in many additional defense areas. In a number of these areas it is proposed to establish full-time joint city-county units which will replace existing part-time city units and part-time county units with overlapping authority. Such part-time services are usually unsatisfactory, and can frequently be combined and placed on a full-time basis with considerable increase in efficiency and little or no additional cost to the communities involved.

PROVISIONAL MORTALITY RATES FOR THE FIRST 9 MONTHS OF 1941

The mortality rates in this report are based upon preliminary data for 36 States, the District of Columbia, and Alaska for the first 9 months of 1941. Comparative data by quarters for 1939 and 1940 are presented for 33 States and the District of Columbia.

This report is made possible through arrangement with the respective States which voluntarily furnish provisional monthly tabulations of current birth and death statistics to the United States Public Health Service, which analyzes and publishes the data. Because of lack of uniformity in the method of classifying deaths according to cause as well as some delay in filing certificates, these data are preliminary and may differ in some instances from the final figures subsequently published by the Bureau of the Census.

[3] Certain unshaded areas on the accompanying map (fig. 1) which are nevertheless relatively densely populated, such as eastern Massachusetts, Connecticut, and southeastern Michigan, are served by full-time municipal health units.

In the past these preliminary reports have accurately reflected the trend in mortality rates for the country as a whole. Some deviation from the final figures for individual States, especially for figures of specific causes of death, may be expected because of the provisional nature of the information. Nevertheless, it is believed that the trend in mortality within each State is correctly represented. Comparisons of specific causes of death for different States may be subject to some error because of variations in tabulation procedure and promptness of filing the original certificates.

During the first 9 months of 1941 the death rate from all causes was 10.5 per 1,000 population compared with 10.6 and 10.4 for the corresponding period in 1940 and 1939, respectively (fig. 1). Twenty-

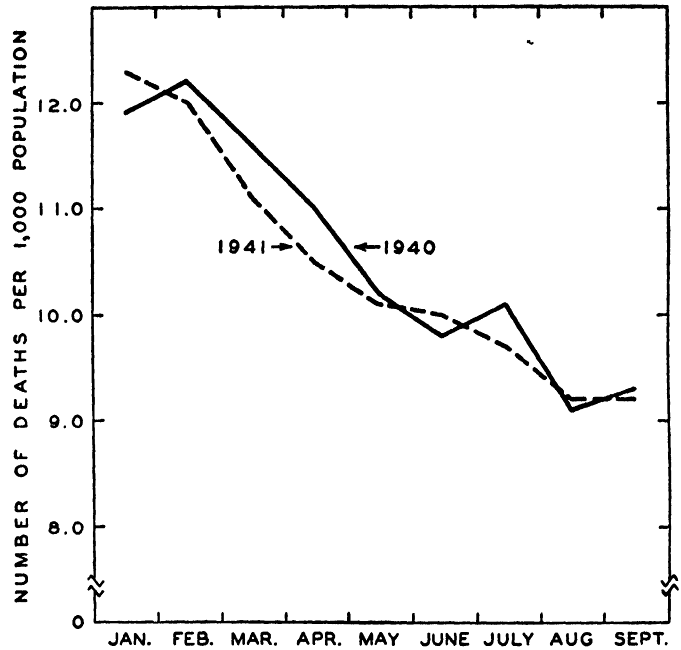

FIGURE 1.—Death rates per 1,000 population, by months, 1941 and 1940.

two of the 33 States reported a rate as low as or lower than for 1940.

The decrease in the general mortality rate resulted from a decrease in most of the important causes of death. Deaths from tuberculosis, diabetes, cerebral hemorrhage, heart disorders, pneumonia, diseases of the digestive system, and nephritis were relatively less numerous than during the first 9 months of 1940. The death rates for two of the four principal diseases of childhood, scarlet fever and diphtheria, were also lower than last year, but this decrease was more than counterbalanced by an increase in the death rates for measles and whooping cough so that the rate for the four diseases combined was nearly 50 percent higher than in 1940.

The most important increases in mortality rates as compared with the previous year were in the rates for influenza, cancer, and accidents. Most of the increase in the accident rate is due to an increase in fatal automobile accidents; the rate for accidents exclusive of automobile increased from 46.2 per 100,000 population to 47.3 per 100,000, or about 2 percent, while the rate for automobile accidents alone increased from 21.8 to 25.7 per 100,000, or 18 percent.

During the third quarter of the year the most severe epidemic of encephalitis on record occurred in a group of northwestern States adjacent to the Canadian border. The epidemic was most fatal in North Dakota where the death rate for the first 9 months of 1941 was 24.5 per 100,000 compared with a corresponding rate of 1.7 per 100,000 population in 1940. In South Dakota the respective rates were 6.9 and 0.2 per 100,000. Although the disease was also epidemic in Minnesota, Montana, and Nebraska the number of cases and the number of deaths were considerably less in these States.

Both the maternal and infant mortality rates continued to decline; the decrease in the maternal mortality rate was widespread, 30 of the 32 States reporting a rate as low as or lower than that for the corresponding period in 1940.

An increase in the birth rate was reported by 27 States. The rate, 18.1 per 1,000 population, was 5 percent higher than that for last year.

Provisional mortality from certain causes in the first 9 months of 1941, with comparative provisional data for the corresponding period in preceding years

State and period	All causes rate per 1,000 population (annual basis)	Birth (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Cerebrospinal (meningococcus) meningitis (6)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Tuberculosis, all forms (13-22)	Influenza (grippe) (33)	Measles (35)	Acute poliomyelitis and polioencephalitis (36)	Acute infectious encephalitis (lethargic) (37)	Cancer, all forms (45-55)	Diabetes mellitus (61)	Cerebral hemorrhage, embolism, and thrombosis (83a, b)	Diseases of the heart (90-95)	Pneumonia, all forms (107-109)	Diseases of the digestive system (115-129)	Diarrhea and enteritis, under 2 years (119)	Nephritis, all forms (130-132)	All accidents, including automobile accidents (169-195)	Automobile accidents (170a, b, c)
34 STATES																								
January-September																								
1941	10.5	18.1	46	5.4	0.7	0.5	0.3	2.9	0.6	44.3	18.4	1.9	0.5	0.7	119.1	26.3	88.0	291.[illegible]	48.4	54.5	7.8	72.3	71.9	25.7
1940	10.6	17.2	47	6.1	1.0	.5	.5	2.0	.8	45.1	15.5	.6	.6	.6	118.4	26.7	91.1	292.6	53.7	57.7	7.4	76.8	69.1	21.8
1939	10.4	16.9	48	6.3	1.4	.5	.7	2.3	1.1	46.0	17.8	.9	.4	.5	114.5	25.6	86.4	276.7	60.6	60.3	8.7	71.6	67.1	20.2
January-March																								
1941	11.8	16.9	53	4.5	.4	.6	.5	3.0	.8	46.8	44.6	1.6	.3	.5	119.0	30.9	98.0	340.2	80.8	50.2	3.6	82.4	67.4	23.3
1940	11.9	16.1	53	5.5	.5	[illegible]	.8	1.8	1.4	46.6	33.1	.8	.3	.6	119.7	31.3	102.5	336.1	86.9	53.2	3.7	86.1	67.5	19.5
1939	11.8	16.3	56	5.8	.7	.7	1.2	2.4	1.7	47.3	33.8	1.2	.1	.5	115.5	29.8	96.6	318.7	105.9	55.6	4.6	81.3	62.9	18.2
April-June																								
1941	10.2	17.6	45	5.6	.6	.5	.4	3.1	.3	46.8	8.6	3.6	.3	.5	119.0	26.0	87.9	287.1	39.9	52.0	5.6	72.6	69.5	24.0
1940	10.4	17.0	47	6.4	.7	.5	.5	2.0	.5	47.2	10.4	.9	.2	.6	117.1	25.7	89.3	290.4	47.1	55.8	7.5	77.5	64.8	20.8
1939	10.3	16.5	48	6.2	1.0	.5	.6	2.4	.7	48.6	16.4	1.2	.3	.4	114.5	25.4	86.5	275.2	51.2	58.5	8.4	72.7	65.7	18.8
July-September																								
1941	9.4	19.8	41	6.3	1.2	.4	.2	2.6	.6	39.6	2.6	.7	1.0	1.1	119.4	22.1	78.4	248.7	25.1	61.2	14.2	62.1	78.7	29.6
1940	9.5	18.5	41	6.5	1.7	.3	.3	2.1	.6	41.5	3.2	.2	1.5	.6	118.4	23.2	81.7	251.6	27.3	63.9	11.1	66.8	74.8	25.0
1939	9.2	17.8	41	6.8	2.5	.4	.3	2.0	.9	42.[illegible]	3.4	.3	.9	.5	113.3	21.7	76.3	236.9	25.5	66.6	13.1	61.1	72.4	23.6
Metropolitan Life Insurance Co., industrial policyholders (January-September) [2]																								
1941	7.6				.4		.5	1.3	.6	43.9	9.1	1.0			104.2	27.9	61.4	[3]211.8	33.2		[4]4.4	[5]52.1	50.9	20.2
1940	7.7				.6		.6	1.2	.8	45.1	8.6	.4			102.3	29.2	61.3	[3]212.1	38.0		[4]4.3	[5]56.9	46.4	16.8
1939	7.8		--		.7		.8	1.8	1.1	45.9	11.1	.7			100.3	28.0	60.1	[3]207.9	46.6		[4]5.5	[5]52.0	46.2	16.1

See footnotes at end of table.

Provisional mortality from certain causes in the first 9 months of 1941, with comparative provisional data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Cerebrospinal (meningococcus) meningitis (6)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Tuberculosis, all forms (13-22)	Influenza (grippe) (33)	Measles (35)	Acute poliomyelitis and polioencephalitis (36)	Acute infectious encephalitis (lethargic) (37)	Cancer, all forms (45-55)	Diabetes mellitus (61)	Cerebral hemorrhage, embolism, and thrombosis (83a, b)	Diseases of the heart (90-95)	Pneumonia, all forms (107-109)	Diseases of the digestive system (115-129)	Diarrhea and enteritis, under 2 years (119)	Nephritis, all forms (130-132)	All accidents, including automobile accidents (169-195)	Automobile accidents (170a, b, c)
New Mexico																								
1941	10.5	27.2	97	3.8	2.2	.2	.2	11.3	2.0	66.6	18.1	11.3	.2	.5	52.4	11.5	42.6	116.1	54.9	85.5	47.5	49.0	97.2	40.7
1940	10.6	31.0	88	4.7	2.2	.5	.2	10.2	1.5	74.7	12.5	1.0	.5	(6)	56.2	10.2	42.0	116.4	52.0	87.2	42.7	49.5	89.7	40.7
1939	11.0	30.0	98	4.3	2.8	1.3	.5	7.2	3.6	71.5	24.3	1.0	1.3	(6)	53.1	7.9	38.6	107.3	87.6	84.8	36.0	48.5	82.5	36.0
New York																								
1941	10.9	15.7	32	2.3	.2	.5	.2	.7	.1	46.6	4.7	.4	.3	.9	155.6	40.2	71.1	385.1	44.6	53.1	2.7	59.2	61.0	17.8
1940	11.2	14.7	37	3.1	.2	.4	.3	1.1	.1	47.[illegible]	3.3	.1	.1	.9	156.9	40.6	72.4	385.4	47.0	58.0	3.0	66.2	61.4	16.5
1939	11.3	14.3	39	3.0	.4	.5	.4	.9	.3	49.0	4.7	.5	.3	.5	153.0	39.9	66.3	365.2	59.5	60.9	4.5	67.8	60.9	16.0
North Carolina																								
1941	9.0	23.6	61	4.5	1.0	.3	.3	6.0	1.4	50.1	31.4	3.3	.3	.4	59.9	12.6	79.5	161.3	58.4	52.8	19.4	84.5	68.8	33.0
1940	9.1	22.5	58	5.8	1.1	.3	.3	2.1	2.5	50.[illegible]	25.9	.4	.4	.4	57.7	14.0	85.4	153.4	61.2	52.4	12.9	97.5	61.5	23.4
1939	8.9	22.4	59	5.2	1.4	.5	.4	2.4	2.6	51.1	19.5	2.2	.2	.2	54.8	13.0	79.9	158.0	60.9	65.0	20.2	81.1	61.4	23.6
North Dakota																								
1941	8.3	21.9	39	1.9	(6)	(6)	.4	2.3	1.3	20.6	13.2	.4	.2	21.5	89.6	21.2	74.5	205.1	36.7	46.1	3.8	47.6	63.3	15.9
1940	7.9	17.1	39	1.5	.6	(6)	1.0	1.9	1.7	19.6	10.2	.2	.2	1.9	97.5	23.3	70.6	206.7	39.2	51.9	5.4	41.3	53.6	17.1
1939	7.8	20.9	45	2.7	.8	.6	1.0	2.1	.8	21.4	21.6	4.1	(6)	.8	86.0	20.9	70.7	192.1	55.8	49.0	6.2	39.0	43.5	11.9
Ohio																								
1941	11.1	17.2	41	2.6	.3	.2	.3	2.7	.3	42.4	16.5	2.1	.7	.7	136.8	29.0	103.8	308.6	43.9	54.0	7.0	73.0	87.0	32.5
1940	11.4	16.5	38	3.6	.8	.4	.7	1.7	.4	40.6	15.0	(6)	.6	.5	136.1	30.9	112.7	316.2	54.5	54.2	4.2	78.1	86.9	27.0
1939	11.2	15.5	42	3.8	.7	.2	1.1	1.3	.8	43.3	21.7	.1	.2	.6	131.4	28.4	107.9	295.8	62.1	56.3	5.2	76.8	80.8	24.9
Oklahoma																								
1941	8.8	19.7	51	2.9	1.6	.3	.3	6.4	2.3	46.4	28.1	1.1	.6	.4	83.2	15.2	77.7	186.2	53.0	48.5	4.4	56.3	61.0	21.3
1940	8.7	18.7	47	3.6	2.4	1.1	.3	2.1	2.2	47.4	23.6	.2	1.5	.7	81.9	14.2	80.6	161.6	55.5	59.7	10.0	62.5	56.1	18.8
1939	9.1	18.3	55	4.4	4.1	.5	.9	[illegible]	2.5	46.6	23.8	4.3	.4	.6	78.3	13.9	87.1	155.3	65.6	64.7	10.1	58.1	87.6	21.3
Oregon																								
1941	10.8	17.1	31	1.8	.4	.6	.2	.7	.4	25.8	13.8	1.2	.2	1.0	137.1	22.8	108.4	295.8	35.6	42.4	.7	100.0	111.4	36.5
1940	11.0	16.4	30	2.7	1.0	.7	.1	.6	1.2	26.5	12.5	1.2	.9	1.3	138.2	25.4	100.8	291.9	37.5	49.7	1.3	112.9	100.6	31.4
1939	10.9	15.6	36	2.3	1.0	.2	.6	.9	.2	29.7	8.3	.9	.2	.7	129.9	23.6	106.2	281.1	42.8	42.3	1.9	114.1	90.3	27.5

Pennsylvania																							
1941	10.8	18.2	38	2.4	5	3	3	1.6	3	39.7	12.8	1.3	7	.7	123.0	34.8	84.4	337.3	44.5	48.6	4.3	84.5	57.6	18.1
1940	11.0	16.3	43	2.7	6	7	5	1.2	4	40.5	12.2	1	3	6	124.2	35.6	84.6	336.5	51.1	54.9	3.7	96.6	56.5	15.3
1939	10.7	16.5	44	3.3	6	6	6	1.6	6	41.3	14.0	1	4	7	124.2	33.8	82.9	321.6	52.3	53.4	4.7	84.4	52.9	14.2
Rhode Island																							
1941	11.0	16.1	37	2.3	(6)	4	4	2	(6)	38.3	6.8	2	6	4	149.2	38.8	83.4	381.9	48.7	57.1	2.6	104.1	60.1	10.2
1940	11.2	15.2	38	2.5	1.3	9	4	4	4	32.9	4.3	6	4	2	160.3	38.7	99.5	368.7	54.6	54.8	1.9	96.0	49.2	10.9
1939	10.9	14.6	39	3.2	(6)	4	(6)	2.6	2	39.7	6.4	2	(6)	(6)	152.2	32.3	85.9	354.8	62.2	61.5	4.3	95.5	49.1	10.1
South Carolina [9]																							
1941	10.7	22.5	82	6.2	2.3	1.0	3	12.0	1.1	44.5	44.6	9.9	2	1	56.1	13.5	92.9	190.2	73.1	48.1	9.0	91.1	76.1	31.6
1940	10.7	20.9	75	7.0	5.4	1.1	2.3	2.3	1.7	46.7	43.3	8	6	3	56.5	13.6	104.0	206.6	72.9	51.0	6.7	94.9	74.1	27.3
1939	10.0	20.2	71	6.3	4.9	5	2	8.7	1.6	44.6	30.5	7	3.0	2	51.3	12.7	95.1	188.1	67.9	43.0	7.9	88.6	63.1	23.4
South Dakota																							N
1941	9.0	19.2	43	1.9	4	4	2	4.2	2.1	28.5	[illegible] 1	2	2	6.9	100.4	25.2	84.1	207.4	42.9	44.8	2.5	55.4	71.2	21.2
1940	9.0	19.0	39	4.0	(6)	4	8	4	8	37.4	16.4	6	2	2	102.2	23.0	81.6	206.8	36.3	53.8	4.8	50.9	66.0	18.7
1939	8.9	17.7	44	3.4	1.4	8	1.4	8	2.7	28.7	26.4	5.8	6	6	99.7	28.9	75.1	200.6	60.7	62.7	6.6	43.3	48.9	17.3
Tennessee																							
1941	9.8	19.1	58	3.9	1.5	1.1	3	6.1	1.0	80.3	39.0	5.5	1.1	6	87.9	12.4	79.1	174.7	64.7	56.7	12.8	64.6	60.8	20.3
1940	10.2	17.8	56	5.4	2.1	6	5	3.6	1.1	74.9	35.8	8	1	6	71.8	14.2	85.0	195.4	75.1	60.7	10.6	61.6	62.7	16.2
1939	9.6	16.9	55	5.5	3.0	6	6	3.3	1.6	79.2	36.3	1.5	6	7	69.8	12.6	79.8	169.3	69.0	66.7	13.7	58.9	60.0	17.3
Texas																							
1941	9.3	(8)	(8)	(8)	2.1	5	1	3.9	1.9	56.2	34.7	1.5	8	4	78.9	13.1	59.6	189.8	47.2	59.4	16.7	62.9	74.7	28.8
1940	9.5	(8)	(8)	(8)	3.5	4	2	4.3	2.0	58.2	28.2	4.1	6	5	74.9	14.1	62.2	179.4	54.7	88.2	34.5	56.6	66.1	24.4
1939	8.8	17.1	67	5.0	4.6	3	3	4.1	2.2	58.3	23.6	1.6	1.1	3	66.8	12.0	60.8	163.0	57.5	78.8	29.1	53.1	61.8	21.9
Utah																							
1941	8.1	24.5	29	1.3	7	2	(6)	1.9	(6)	11.1	10.6	(6)	(6)	7	84.9	20.7	60.1	243.4	28.1	43.0	2.9	51.7	81.8	36.6
1940	8.5	24.5	37	2.8	5	5	1.5	2.4	(6)	15.0	12.8	1.0	1.2	5	90.6	18.9	58.4	236.2	35.1	53.8	3.4	47.5	81.4	32.9
1939	8.2	23.1	39	3.2	5	7	2	1.0	5	15.6	8.8	2	5	1.0	93.2	17.1	53.8	227.4	43.5	52.3	1.7	53.0	72.9	28.4
Vermont																							
1941	11.6	18.4	41	2.0	7	1.1	4	(6)	(6)	37.9	17.9	7	4	(6)	141.7	28.3	113.8	363.7	[illegible].6	53.2	4.5	87.0	57.3	20.3
1940	11.1	18.3	32	3.9	1.1	7	(6)	2.2	(6)	36.4	12.3	(6)	4	(6)	135.7	24.5	116.7	317.1	[illegible].4	51.7	5.0	75.5	55.0	16.4
1939	11.7	15.8	36	3.3	(6)	4	1.1	7.1	1.1	41.7	28.3	1.1	1.1	4	143.4	31.7	115.8	371.6	85.3	51.8	3.4	80.4	67.8	19.0
Virginia																							
1941	11.4	21.0	69	4.1	9	1.5	3	7.9	1.0	61.7	34.2	7.8	5	1	84.8	19.8	101.6	255.7	62.3	55.4	15.5	100.1	90.0	35.4
1940	11.1	19.8	59	4.7	9	1.3	3	4.0	1.7	60.4	29.3	1.0	6	8	80.4	20.5	101.8	251.3	72.1	48.7	8.6	106.8	82.1	28.2
1939	10.7	19.3	63	5.1	1.7	1.0	3	6.0	2.7	62.3	24.2	1.1	3	.3	79.3	17.2	102.6	241.9	67.1	53.3	11.2	86.4	70.6	27.2
West Virginia																							
1941	9.0	20.3	63	3.2	1.6	1.7	6	9.0	8	44.4	29.0	4.1	6	4	75.4	16.9	79.6	168.4	51.8	56.0	18.8	60.4	80.3	23.1
1940	8.9	20.2	52	4.5	1.8	1.5	9	5.3	2.0	46.2	19.9	(6)	1.6	4	72.8	16.4	77.4	167.2	53.2	42.9	12.8	66.1	85.5	18.2
1939	9.0	20.3	55	3.6	3.1	2.1	9	2.1	2.0	45.5	21.3	4	3	7	73.0	16.1	76.6	168.5	61.6	60.3	16.0	65.0	72.7	16.1
Wisconsin																							
1941	9.6	17.3	36	2.7	3	1	6	9	(7)	25.5	12.2	8	3	7	130.4	28.3	89.9	289.4	37.9	(8)	2.2	52.9	70.5	24.8
1940	10.1	17.4	37	2.8	2	2	9	9	2	25.8	13.4	4	1.0	8	134.7	28.5	96.2	299.2	49.1	(8)	3.3	57.7	76.6	23.0
1939	10.2	17.2	42	2.8	2	3	1.1	1.6		27.7	21.0	9	4	2	127.3	27.3	87.1	301.2	51.0	(8)	4.7	58.4	74.2	21.0

[1] Includes all States except South Dakota, with data for the 9-month period of 1941 1940, and 1939 The District of Columbia is included as a State Estimated population July 1, 1941, 95,033,600

[2] These data are taken from the October 1940 and 1941 Statistical Bulletins published by the Metropolitan Life Insurance Co All figures are provisional and are subject to correction, since they are based on provisional estimates of lives exposed to risk Data do not include all diseases reported to the Public Health Service

[3] Excludes pericarditis, acute endocarditis, and acute myocarditis

[4] Classified as diarrhea and enteritis, age not specified.

[5] Chronic nephritis only

[6] No deaths reported

[7] Less than 0 1 per 100,000 population.

[8] Data not available

[9] January to August only.

MORTALITY SUMMARY FOR LARGE CITIES IN THE UNITED STATES, 1941

The number of deaths in 88 major cities of the United States during 1941 decreased 0.4 percent as compared with 1940, the respective figures being 443,782 and 445,504, according to provisional reports recently issued by the Bureau of the Census. The percentage decrease on a rate basis, however, is much more, the rates for the respective years being 11.7 and 11.8 per 1,000 population. On the other hand, the number of infant deaths reported increased 4.9 percent; but on a rate basis this increase is changed to a decrease of 8.9 percent in 1941 as compared with 1940.

General mortality.—Except for three periods during the year, the weekly death rates for these major cities in 1941 were below the average rates for the 3 years 1938–40, inclusive. The first of these periods occurred in January and February, which corresponded with the period of the influenza epidemic. The other two occurred in June and August, respectively. These latter sharp increases in mortality were closely related to excessive temperatures which prevailed over a large portion of the country.

Infant mortality.—The 28,166 infant deaths reported in 1941 represent a numerical increase of 1,319 over the 26,847 such deaths reported in 1940. The respective rates (infant deaths per 1,000 estimated live births) for 1941 and 1940, however, are 36.9 and 40.5.

Although the figures for 1941 given in this summary are compiled from weekly telegraphic reports, it is expected, on the basis of past experience, that they will agree closely with the final figures. All mortality figures are tabulated on the basis of place of death, not place of residence. The death rates are based on populations as enumerated in the 1940 census.

	Provisional		Final
	1941	1940	1940
Total deaths, 88 cities	[1] 443,782	[1] 445,504	[2] 441,136
Deaths per 1,000 population	[3] 11 7	--	[3] 11 8
Deaths under 1 year of age	[1] 28,166	[1] 26,847	[2] 27,527
Deaths under 1 year of age per 1,000 live births	[3] 36 9	-----	[4] 40 5

[1] Based upon weekly telegraphic reports from city health officers

[2] Tabulation of transcripts from State registrars' offices

[3] Although figures are shown for a 53-week period for 1941, rates are computed on a calendar year basis, total death rates are per 1,000 enumerated populations as of April 1, 1940, and infant mortality rates are per 1,000 estimated live births

[4] The final infant death rate is the number of deaths under 1 year per 1,000 live births, based upon tabulations of transcripts received from State registrars' offices

DEATHS DURING WEEK ENDED JANUARY 24, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Jan 24, 1942	Corresponding week, 1941
Data from 85 large cities of the United States.		
Total deaths	9,607	10,228
Average for 3 prior years	9,499	
Total deaths, first 3 weeks of year	28,094	29,280
Deaths per 1,000 population, first 3 weeks of year, annual rate	13.4	14.0
Deaths under 1 year of age	514	537
Average for 3 prior years	507	
Deaths under 1 year of age, first 3 weeks of year	1,686	1,636
Data from industrial insurance companies		
Policies in force	64,888,248	64,729,355
Number of death claims	13,533	14,263
Death claims per 1,000 policies in force, annual rate	10.9	11.5
Death claims per 1,000 policies, first 3 weeks of year, annual rate	10.3	11.0

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JANUARY 31, 1942

Summary

The incidence of influenza for the country as a whole continues low. A total of 4,899 cases was reported for the current week, as compared with 4,332 for the preceding week, a 5-year (1937–41) median of 17,641, and 61,809 cases for the corresponding week last year. Of the current total, the South Atlantic and South Central States reported 4,224 cases, or 86 percent. (These areas constitute about 32 percent of the total population of the United States.) Texas reported 1,685 cases, South Carolina 647, Alabama 644, Virginia 392, and Arkansas 267. No other State reported more than 200 cases, and only 4 other States reported more than 100 cases during the current week.

Of the 9 common communicable diseases (first 9 listed in the following table) for which earlier weekly records are available, the incidence of only meningococcus meningitis and whooping cough was above the 5-year median expectancy. Only 26 cases of smallpox and 72 cases of typhoid fever were reported, the lowest incidence for each of these diseases for the corresponding week of any earlier year on record. The incidence of diphtheria (354 cases) is lower than for any corresponding week in prior years excepting 1941 (310 cases).

One case of anthrax was reported (in Pennsylvania), 19 cases of amebic dysentery, 51 cases of bacillary dysentery (27 in Texas), and 37 cases of dysentery, unspecified (26 in Virginia). Of 47 cases of endemic typhus fever, 17 occurred in Georgia, 10 in Alabama, and 8 in Texas. Twenty-five cases of tularemia were reported (8 in Georgia).

Urban mortality, a current index to health conditions, especially with reference to respiratory diseases at this season, has been favorable so far during the current year. The crude death rate for the week for 88 large cities in the United States was 12.5 per 1,000 population, as compared with 13.0 for the preceding week and 13.8 for the 3-year (1939–41) average. The accumulated rate for the first 4 weeks of 1942 is 13.2, as compared with 14.0 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended January 31, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41
	Jan. 31, 1942	Feb. 1, 1941		Jan. 31, 1942	Feb 1, 1941		Jan. 31, 1942	Feb. 1, 1941		Jan 31, 1942	Feb. 1, 1941	
NEW ENG.												
Maine	0	0	2	1	197	32	282	69	69	1	0	0
New Hampshire	1	0	0	---	27	1	3	48	16	0	2	0
Vermont	3	0	0	---	128	---	7	12	12	0	0	0
Massachusetts	4	2	4	---	---	---	227	438	438	4	1	1
Rhode Island	2	0	0	---	23	---	117	0	7	0	0	0
Connecticut	0	0	1	5	623	8	107	44	143	1	1	1
MID. ATL.												
New York	24	13	28	[1] 13	[1] 632	[1] 155	514	2,456	564	10	1	4
New Jersey	8	22	12	13	1,579	42	0	813	440	2	2	1
Pennsylvania	13	9	43	---	---	---	1,137	2,341	140	7	5	7
E. NO. CEN												
Ohio	11	9	21	15	1,903	118	152	1,051	65	3	1	2
Indiana	14	16	18	50	291	291	61	105	15	0	1	1
Illinois	25	29	32	13	138	130	120	1,339	31	0	1	4
Michigan [2]	2	11	18	2	374	14	141	1,964	427	1	0	1
Wisconsin	3	0	2	51	414	47	241	554	547	0	0	0
W. NO. CEN												
Minnesota	2	0	3	3	2,111	5	613	14	34	0	0	[illegible]
Iowa	3	9	6	6	574	11	139	138	98	1	0	[illegible]
Missouri	5	10	19	5	245	145	55	31	8	1	0	[illegible]
North Dakota	1	4	3	5	101	19	117	13	13	0	0	[illegible]
South Dakota	[illegible]	0	1	1	13	2	2	31	31	0	0	[illegible]
Nebraska	2	0	0	---	---	4	58	3	3	0	0	[illegible]
Kansas	7	6	7	7	538	143	246	185	185	0	0	[illegible]
SO. ATL.												
Delaware	0	3	1	---	11	---	1	33	11	0	1	[illegible]
Maryland [2]	11	4	8	5	577	119	259	25	26	4	0	[illegible]
Dist. of Col.	0	2	7	1	124	24	11	14	14	4	0	[illegible]
Virginia	10	9	12	392	11,516	617	168	447	180	6	1	[illegible]
West Virginia	3	2	9	34	6,046	175	369	125	15	1	0	[illegible]
North Carolina	20	17	18	66	2,868	47	633	152	152	0	1	[illegible]
South Carolina	7	6	6	647	8,645	827	88	114	44	1	9	[illegible]
Georgia	12	8	8	183	3,588	600	330	93	46	0	3	[illegible]
Florida	6	7	10	10	212	20	75	11	30	3	2	2
E. SO. CEN.												
Kentucky	7	6	9	6	399	91	35	108	51	1	3	5
Tennessee	2	5	8	85	2,277	320	48	60	74	3	4	3
Alabama	15	7	12	644	4,701	466	62	68	68	3	2	2
Mississippi [2]	7	3	5	---	---	---	---	---	---	---	1	1
W. SO. CEN.												
Arkansas	[3] 8	8	8	[3] 267	1,625	864	[3] 204	120	32	0	1	1
Louisiana	15	8	9	26	308	121	39	3	3	1	2	1
Oklahoma	11	7	13	173	797	505	403	4	13	1	2	2
Texas	53	36	50	1,685	4,580	2,435	1,119	218	218	1	5	3
MOUNTAIN												
Montana	2	5	1	14	308	50	77	4	6	0	0	0
Idaho	1	1	1	1	922	6	25	14	64	0	0	0
Wyoming	0	1	1	37	182	4	20	7	7	1	0	0
Colorado	13	6	7	50	385	24	166	94	48	0	0	1
New Mexico	4	5	4	---	37	12	100	37	29	0	0	0
Arizona	4	3	3	131	408	288	150	85	4	0	0	1
Utah [2]	0	2	2	15	76	9	40	4	54	0	0	0
Nevada	0	0	---	---	---	---	3	0	---	0	0	---
PACIFIC												
Washington	0	0	1	58	83	83	20	81	81	0	0	0
Oregon	2	0	2	24	74	74	87	263	22	0	0	1
California	11	9	28	155	1,149	1,149	1,618	108	174	4	1	1
Total	354	310	580	4,899	61,809	17,641	10,489	14,031	10,844	65	53	55
4 weeks	1,481	1,530	2,489	16,925	433,797	55,967	36,328	54,544	36,655	230	231	210

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended January 31, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Jan. 31, 1942	Feb. 1, 1941		Jan. 31, 1942	Feb. 1, 1941		Jan. 31, 1942	Feb. 1, 1941		Jan. 31, 1942	Feb. 1, 1941	
NEW ENG.												
Maine	0	0	0	21	3	19	0	0	0	0	0	0
New Hampshire	1	0	0	25	10	8	0	0	0	0	1	0
Vermont	0	0	0	4	4	10	0	0	0	1	3	0
Massachusetts	1	0	0	324	127	194	0	0	0	2	1	2
Rhode Island	0	0	0	10	10	20	0	0	0	0	0	0
Connecticut	0	1	0	31	35	77	0	0	0	0	3	0
MID. ATL.												
New York	3	1	1	388	368	581	0	0	0	3	6	6
New Jersey	1	0	1	104	266	177	0	0	0	0	0	0
Pennsylvania	1	0	0	348	239	468	0	0	0	6	2	7
E. NO. CEN.												
Ohio	0	4	2	339	218	444	0	0	8	3	1	1
Indiana	5	0	0	125	145	195	2	2	4	3	0	0
Illinois	1	0	2	252	387	551	0	1	10	1	2	8
Michigan [2]	1	1	0	207	231	560	1	3	2	1	1	1
Wisconsin	0	0	0	214	145	221	0	15	13	2	0	0
W. NO. CEN.												
Minnesota	0	0	0	93	56	147	1	23	17	1	0	0
Iowa	0	1	0	47	75	123	1	0	24	1	5	2
Missouri	1	0	0	56	60	129	1	1	10	0	1	1
North Dakota	0	0	0	19	8	28	0	0	10	0	2	0
South Dakota	0	1	0	32	12	21	0	1	4	0	0	0
Nebraska	0	0	0	34	13	43	2	1	2	0	0	0
Kansas	0	0	0	90	81	169	1	2	11	0	2	1
SO. ATL.												
Delaware	0	0	0	52	12	12	0	0	0	0	0	0
Maryland [2]	0	0	0	75	65	57	0	0	0	2	2	2
Dist. of Col.	0	0	0	13	16	16	0	0	0	1	0	0
Virginia	0	0	0	50	53	41	0	0	0	5	1	2
West Virginia	0	2	0	56	30	51	0	0	0	0	2	2
North Carolina	0	0	1	72	53	53	0	0	0	0	0	4
South Carolina	2	0	0	6	11	6	0	0	0	1	1	2
Georgia	1	1	1	48	29	18	2	0	0	10	1	3
Florida	0	2	1	7	7	11	0	0	0	1	2	1
E. SO. CEN.												
Kentucky	0	1	1	100	92	77	0	0	0	2	0	0
Tennessee	0	0	0	81	67	53	3	1	1	4	4	3
Alabama	1	0	0	18	21	14	0	0	0	2	2	2
Mississippi [2]	0	1	1	8	19	10	1	0	0	1	0	2
W. SO. CEN.												
Arkansas [2]	0	0	0	[3] 6	9	9	1	0	2	[3] 3	3	3
Louisiana	0	1	1	9	6	15	1	0	0	6	7	5
Oklahoma	0	0	0	24	9	31	1	0	0	1	1	1
Texas	1	1	2	64	75	108	6	5	5	5	10	10
MOUNTAIN												
Montana	0	0	0	32	35	35	0	0	4	0	0	0
Idaho	0	0	0	3	17	17	0	1	2	1	0	0
Wyoming	0	0	0	12	8	8	0	0	0	0	0	0
Colorado	0	0	0	43	30	33	0	1	4	0	2	0
New Mexico	1	0	0	9	6	18	0	1	0	0	1	1
Arizona	0	0	0	7	15	11	0	0	0	0	2	1
Utah [2]	0	0	0	38	6	23	0	0	1	0	0	0
Nevada	0	0	------	0	0	------	0	0	------	0	3	------
PACIFIC												
Washington	1	1	1	29	32	73	0	0	2	1	0	1
Oregon	0	0	0	11	17	34	0	0	11	1	1	0
California	2	1	2	110	115	221	2	1	6	1	8	5
Total	24	20	26	3,746	3,348	5,343	26	59	275	72	83	95
4 weeks	109	160	97	14,120	16,047	20,581	67	248	1,144	315	391	458

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended January 31, 1942—Continued

Division and State	Whooping cough, Week ended— Jan 31, 1942	Whooping cough, Week ended— Feb 1, 1941	Week ended Jan. 31, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	47	29	0	0	0	0	0	0	0	0	0
New Hampshire	26	6	0	0	0	0	0	0	0	0	0
Vermont	57	16	0	0	0	0	0	0	0	0	0
Massachusetts	304	186	0	0	4	0	1	0	0	0	0
Rhode Island	51	11	0	0	0	0	0	0	0	0	0
Connecticut	132	59	0	0	1	0	1	0	0	0	0
MID ATL.											
New York	683	315	0	0	6	0	0	0	0	0	1
New Jersey	235	132	0	1	0	0	0	0	0	0	1
Pennsylvania	288	304	1	0	0	0	0	0	0	0	0
E NO CEN											
Ohio	331	336	0	0	0	0	0	0	0	1	0
Indiana	58	14	0	0	0	0	0	0	0	1	0
Illinois	213	125	0	2	3	0	1	0	0	2	0
Michigan [2]	262	301	0	1	0	0	0	0	0	0	0
Wisconsin	371	130	0	0	0	0	0	0	0	1	0
W NO CEN.											
Minnesota	136	76	0	1	0	0	0	0	0	1	0
Iowa	35	31	0	0	0	0	0	0	0	0	0
Missouri	14	41	0	0	0	0	0	0	0	0	0
North Dakota	15	15	0	0	0	0	0	0	0	0	0
South Dakota	11	7	0	0	0	0	0	0	0	0	0
Nebraska	8	46	0	0	0	0	0	0	0	0	0
Kansas	66	67	0	0	0	0	2	0	0	1	0
SO ATL											
Delaware	2	25	0	0	0	0	0	0	0	0	0
Maryland [2]	41	92	0	0	0	5	0	0	0	0	0
Dist of Col	22	8	0	2	0	0	0	0	0	0	0
Virginia	77	138	0	0	0	26	0	0	0	2	0
West Virginia	49	102	0	0	0	0	0	0	0	0	0
North Carolina	232	231	0	0	0	0	0	0	0	0	2
South Carolina	100	91	0	0	0	0	0	0	0	0	1
Georgia	34	18	0	0	6	0	0	0	0	8	17
Florida	28	4	0	1	0	0	0	0	0	0	2
E SO CEN.											
Kentucky	106	72	0	1	0	0	0	0	0	1	0
Tennessee	14	73	0	0	1	0	0	0	0	4	1
Alabama	26	45	0	0	0	0	1	0	0	0	10
Mississippi [2]		----	0	0	0	0	0	0	0	0	1
W SO CEN											
Arkansas	15	28	0	2	0	0	0	0	0	1	0
Louisiana	5	9	0	0	0	0	1	0	0	2	1
Oklahoma	8	15	0	0	0	0	0	0	0	0	0
Texas	139	343	0	3	27	0	0	0	0	0	8
MOUNTAIN											
Montana	11	21	0	0	0	0	0	0	0	0	0
Idaho	6	22	0	0	0	0	0	0	0	0	0
Wyoming	10	0	0	1	0	0	0	0	0	0	0
Colorado	27	44	0	0	0	0	0	0	0	0	0
New Mexico	39	21	0	1	0	0	0	0	0	0	1
Arizona	83	26	0	0	0	6	0	0	0	0	0
Utah [2]	37	57	0	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	136	113	0	0	0	0	0	0	0	0	0
Oregon	36	2	0	0	0	0	0	0	0	0	0
California	202	419	0	3	3	0	1	0	0	0	1
Total	4,828	4,326	1	19	51	37	8	0	0	25	47
Four weeks	17,374	21,336									

[1] New York City only

[2] Period ended earlier than Saturday

[3] Figures for Arkansas are inclusive of delayed reports as follows: Diphtheria, 1, influenza, 11; measles, 1; scarlet fever, 1; typhoid fever, 2.

WEEKLY REPORTS FROM CITIES

City reports for week ended January 17, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	1	0	7	0	6	0	6	0	0	0	0	0
Baltimore, Md	1	0	7	3	132	9	19	0	17	0	0	31
Barre, Vt	0	0		0	0	0	0	0	0	0	0	0
Billings, Mont	0	0		0	0	0	1	1	2	0	0	0
Birmingham, Ala	1	0	17	1	2	0	7	0	8	0	0	0
Boise, Idaho	0	0		0	3	0	0	0	0	0	0	0
Boston, Mass	0	0		2	33	0	15	0	94	0	1	43
Bridgeport, Conn	0	0	1	0	3	1	2	0	3	0	0	0
Brunswick, Ga	0	0		0	0	0	0	0	0	0	0	0
Buffalo, N Y	1	0		0	3	0	7	0	24	0	0	4
Camden, N J	0	0	1	1	2	0	4	0	5	0	0	3
Charleston, S C	0	0	57	0	1	0	2	0	1	0	0	0
Charleston, W. Va	0	0		0	1	0	4	0	0	0	0	0
Chicago, Ill	16	0	14	3	25	0	28	0	88	0	1	101
Cincinnati, Ohio	3	0	1	2	0	1	5	0	22	0	0	29
Cleveland, Ohio	0	0	32	2	12	1	20	0	54	0	0	31
Columbus, Ohio	0	0	1	1	8	0	7	0	9	0	0	7
Concord, N H	0	0		0	0	0	2	0	1	0	0	0
Cumberland, Md	0	0		0	3	0	0	0	1	0	0	0
Dallas, Tex	1	1		0	62	0	7	0	5	0	0	3
Denver, Col	8	0	20	0	42	0	7	0	8	0	0	9
Detroit, Mich	7	0	2	0	31	0	20	0	113	0	1	78
Duluth, Minn	0	0		0	5	0	5	0	6	0	0	3
Fall River, Mass	1	0		0	3	0	0	0	47	0	0	0
Fargo, N Dak	0	0		0	0	0	1	0	0	0	0	0
Flint, Mich	0	0		0	0	0	4	0	9	0	0	11
Fort Wayne, Ind	0	0		0	3	0	2	0	1	0	0	0
Frederick, Md	0	0		0	2	0	0	0	0	0	0	0
Galveston, Tex	0	0		0	1	0	3	0	0	0	1	0
Grand Rapids, Mich	0	0		0	8	0	2	0	4	0	0	4
Great Falls, Mont	0	0		0	27	0	1	0	5	0	0	2
Hartford, Conn	0	0		0	6	0	1	0	7	0	0	5
Helena, Mont	0	0		0	0	0	1	0	0	0	0	3
Houston, Tex	6	0		0	5	0	12	0	1	0	0	0
Indianapolis, Ind	1	0		1	4	0	10	0	25	0	1	20
Kansas City, Mo	0	0		1	8	0	5	0	19	0	0	5
Kenosha, Wis	0	0		0	7	0	0	0	2	0	0	8
Little Rock, Ark	1	0	9	0	3	0	0	0	2	0	0	0
Los Angeles, Calif	7	0	25	2	55	3	16	0	30	0	1	14
Lynchburg, Va	0	0		0	0	0	1	0	0	0	0	1
Memphis, Tenn	0	0	22	4	8	0	2	0	8	0	0	6
Milwaukee, Wis	0	0		0	13	0	1	0	27	0	0	97
Minneapolis, Minn	0	0		1	5	0	4	1	13	0	1	11
Missoula, Mont	0	0		0	0	0	0	0	0	0	0	0
Mobile, Ala	0	0		1	2	0	0	0	2	0	0	0
Nashville, Tenn	0	0		0	0	0	4	0	7	0	0	9
Newark, N J	0	0	4	0	26	0	6	1	19	0	0	31
New Haven, Conn	0	0		0	59	0	1	0	1	0	1	10
New Orleans, La	2	0	2	1	1	1	8	0	3	0	0	4
New York, N Y	21	2	14	2	27	2	92	2	137	0	0	293
Omaha, Nebr	0	0		0	3	0	7	0	7	0	0	1
Philadelphia, Pa	1	0	3	1	7	0	29	0	114	0	0	60
Pittsburgh, Pa	1	1		1	10	1	10	0	10	0	0	10
Portland, Me	0	0	1	0	8	0	3	0	8	0	0	9
Providence, R I	4	0		0	9	0	2	0	7	0	0	48
Pueblo, Colo	0	0		0	108	0	1	0	4	0	0	1
Racine, Wis	1	0		0	4	0	0	0	1	0	0	10
Raleigh, N. C	0	0		0	1	0	1	0	0	0	0	1
Reading, Pa	0	0		1	2	0	1	0	1	0	0	1
Richmond, Va	2	0	2	2	0	1	3	0	3	0	0	0

City reports for week ended January 17, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Roanoke, Va	0	0		0	0	0	0	0	2	0	0	0
Rochester, N Y	0	0		0	2	0	1	0	3	0	0	5
Sacramento, Calif	2	0		0	83	0	3	0	0	0	0	7
St Joseph, Mo	0	0		1	3	0	3	0	0	0	0	1
St Louis, Mo	1	0	2	1	8	2	16	0	18	1	1	3
St. Paul, Minn	0	0		0	96	0	3	0	4	0	0	28
Salt Lake City, Utah	0	0		0	1	0	1	0	4	0	1	3
San Antonio, Tex	2	0	16	2	2	0	7	0	0	0	0	1
San Francisco, Calif	1	0	6	2	9	1	9	1	5	0	1	10
Savannah, Ga	0	0	9	1	37	0	1	0	0	0	0	0
Seattle, Wash	0	0		2	1	0	4	0	3	0	0	34
Shreveport, La	0	0		0	0	0	6	0	1	0	0	0
South Bend, Ind	0	0		0	0	0	0	0	10	0	0	1
Spokane, Wash	0	0		0	2	0	3	0	3	0	0	3
Springfield, Ill	0	0		0	1	0	1	0	0	0	0	0
Springfield, Mass	0	0		0	5	1	6	0	17	0	0	29
Superior, Wis	0	0		0	2	0	0	0	0	0	0	12
Syracuse, N Y	0	0		0	0	1	1	0	5	0	0	50
Tacoma, Wash	0	0		0	0	0	3	0	0	0	0	0
Tampa, Fla	0	0		0	0	0	2	0	2	0	0	0
Terre Haute, Ind	0	0		0	0	0	1	0	1	0	0	0
Topeka, Kans	0	0		0	4	0	1	0	4	0	0	7
Trenton, N J	0	0	2	1	0	0	3	0	4	0	0	2
Washington, D C	4	0	1	0	8	0	10	0	12	0	0	32
Wheeling, W Va	0	0		1	56	0	3	0	0	0	0	2
Wichita, Kans	0	0		0	11	0	6	0	2	0	0	3
Wilmington, Del	2	0		0	0	0	3	0	18	0	0	1
Wilmington, N C	0	0		0	58	0	2	0	1	0	0	2
Winston-Salem, N C	1	0	12	0	43	0	2	0	1	0	0	0
Worcester, Mass	0	0		0	2	1	6	0	[illegible]	0	1	22

Rates (annual basis) per 100,000 population for a group of 89 selected cities (population, 1942, 34,042,779)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet-fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Jan. 17, 1942	15.32	44.42	6.74	173.39	77.81	172.32	0.15	1.84	195.14
Average for week, 1937–41	21.18	390.05	21.18	388.19	130.02	206.39	4.33	2.94	169.90

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended January 3, 1942.—During the week ended January 3, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec [1]	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		3			10			2	3	18
Chickenpox	2	46			321	70	27	5	94	565
Diphtheria		26	7		3	3		1	1	41
German measles	2				20	4	5	11	15	57
Influenza	2	33			2				47	84
Measles		1	1		124	45	36	21	29	257
Mumps		2			215	31	110	28	145	531
Pneumonia	8	9			12		1		11	41
Poliomyelitis			2							2
Scarlet fever	4	12	7		251	8	21	44	18	365
Tuberculosis	1	12	14		28	1	1			57
Typhoid and paratyphoid fever			2		4				2	8
Undulant fever					4				1	5
Whooping cough	1	36	2		63		9	7	53	171
Other communicable diseases	9	14			215	1	1		11	251

[1] Part of the figures for this week are included in the year 1941, the remainder will be reported in the week ended Jan. 10.

CUBA

Habana—Communicable diseases—4 weeks ended December 13, 1941.—During the 4 weeks ended December 13, 1941, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	13		Scarlet fever	1	
Malaria	37		Tuberculosis	6	2
Measles	15		Typhoid fever	14	
Poliomyelitis	1				

GREAT BRITAIN

England and Wales—Infectious diseases—13 weeks ended September 27, 1941.—During the 13 weeks ended September 27, 1941, cases of certain infectious diseases were reported in England and Wales as follows:

Disease	Cases	Disease	Cases
Diphtheria	10,558	Puerperal pyrexia	1,721
Dysentery	1,343	Scarlet fever	11,862
Ophthalmia neonatorum	1,178	Typhoid and paratyphoid fever	2,969
Pneumonia	5,987		

England and Wales—Vital statistics—Third quarter 1941.—The following vital statistics for the third quarter of 1941 for England and Wales are taken from the Quarterly Return of Births, Deaths, and Marriages, issued by the Registrar-General and are provisional:

	Number	Annual rate per 1,000 population		Number	Annual rate per 1,000 population
Live births	147,406	14 1	Deaths under 1 year of age	6,411	[1] 43
Stillbirths	5,009	48	Deaths from diarrhea (under 2 years of age)	731	[1] 5 0
Deaths, all causes	101,337	9 7			

[1] Per 1,000 live births

NOTE —All deaths are of civilians only

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE —Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year All reports of yellow fever are published currently

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month

Yellow Fever

Colombia—Intendencia of Meta—San Martin—Acacias.—On December 14, 1941 1 death from yellow fever was reported in Acacias, San Martin, Intendencia of Meta, Colombia.

THE MECHANISM OF CARBON MONOXIDE POISONING[1]

A Review

The mechanism of CO poisoning was studied in dogs anesthetized with sodium amytal by measuring changes of the spinal and intracranial pressures, the arterial and venous blood pressures, the heart and respiratory rates, and the minute and respiratory volumes. In addition, the CO, CO_2, and O_2 contents of the blood were determined at intervals. It was found that the exposure of dogs, anesthetized with sodium amytal, to air containing 1 percent CO causes a progressive rise of the spinal pressure which is closely associated with an increase of the respiratory rate and a primary rise and subsequent fall of the blood pressure. The intracranial pressure follows closely the changes of the spinal pressure and both remain above their initial level after the heart and circulation have stopped

With exposure to 0.25 percent CO in air the response is similar but more delayed, and several phases of the poisoning which may overlap

[1] Studies on the mechanism of carbon monoxide poisoning as observed in dogs anesthetized with sodium amytal By W F von Oettingen, D D Donahue, P J Valaer, and J W Miller Public Health Bulletin No 274 Government Printing Office, 1941 Available from the Superintendent of Documents, Washington, D C, at 10 cents per copy

each other may be distinguished: (1) A primary stimulation of the medullary center, resulting in increased respiration, rise of the arterial and venous pressures, and slowing of the heart rate; (2) a depression of the peripheral vascular tone, characterized by a fall of the arterial and venous blood pressures; (3) a depression of the cardiac action, illustrated by a fall of the arterial pressure and a rise of the venous pressure; and (4) a final rise of the venous pressure shortly before death because of a reduction of the intrathoracic space caused by stasis and, possibly, edema of the lungs. During the first two phases the spinal and intracranial pressures tend to increase; during the latter stages they are usually on the decline, presumably because of a shift in the distribution of the blood from the periphery into the splanchnic organs.

If animals are exposed to 0.25 percent CO in air until approximately 60 percent of their available hemoglobin is saturated with CO and then allowed to inhale pure air, the spinal pressure first continues to increase, this rise being paralleled by the dysfunctioning of the peripheral and central circulatory apparatus. As it recovers from the acute exposure the spinal pressure decreases but remains at an elevated level for 3 to 4 hours, during which time the circulation has apparently recovered from the acute toxic effects of CO. After this time the heart and circulation start to give evidence of beginning failure. This is paralleled by a secondary rise of the spinal pressure. If the cardiac failure progresses further, especially if it is associated with loss of the vascular tone, the spinal pressure will fall again, perhaps because of a shift of the blood to the splanchnic area. The delayed failure of the circulatory apparatus occurs at a time when the concentration of CO in the blood is reduced to values which are usually considered to be of no clinical significance. Following discontinuation of the exposure to CO the stimulation of the respiration persists for some time until the concentration of CO hemoglobin in the blood has been reduced to approximately 45 percent, indicating that it is caused by an anoxemic stimulation of the carotid sinus. After this time the respiration is slowed but is still materially above normal. It increases again with the beginning of the secondary rise of the spinal pressure. Since at this time the CO has been almost completely eliminated, this secondary rise cannot be due to a stimulation of the carotid sinus. During this period the respiration becomes irregular and because this is associated with fluctuations of the blood pressure and the pulse rate and with a significant and abrupt rise of the body temperature, it is assumed that this is, in part, of central origin. It is suggested that this labored respiration may be a contributing factor to the circulatory failure.

COURT DECISION ON PUBLIC HEALTH

Repeal of statutory provision creating office of State dairy commissioner.—(Arizona Supreme Court; *Johnson* v. *Frohmiller,* 115 P.2d 244; decided July 16, 1941.) Chapter 82 of the 1931 Arizona session laws, an act consisting of over 50 sections, created the office of State dairy commissioner and provided for the full and complete regulation of the dairy industry. This statute, which placed upon the dairy commissioner the duty of enforcing its provisions, appeared in the Arizona Code of 1939 as article 9 of chapter 50. Section 2 of said chapter 82 was the section which created the office of State dairy commissioner, and this section was codified in the 1939 code as section 50–902. Chapter 105 of the 1941 session laws, which was an act creating, and defining the powers and duties of, the State department of health, made mention in its title of the repeal of section 50–902 of the 1939 code and in section 15 provided: "Sections * * * and 50–902, Arizona Code of 1939 (* * * and section 2, chapter 82, laws of 1931), are hereby repealed. * * *"

The State auditor and the governor rejected a claim for traveling expenses incurred by the State dairy commissioner on the ground that chapter 105, Laws of 1941, repealed section 50–902 of the code which created the office of dairy commissioner. In a mandamus proceeding by the dairy commissioner against the auditor it was contended before the State supreme court by the commissioner that chapter 105 did not repeal section 50–902, but if it did that section 1–107 of the code was applicable. Said section 1–107 provided: "A person who at the time an act takes effect holds office under a law by such act repealed, continues to hold the office according to the tenure of the law repealed, unless the duties of such office are expressly transferred to some other office." The court said that it seemed clear from a reading of chapter 105 that the legislature not only abolished the office of dairy commissioner but that it intended to do so, pointing out that in repealing section 50–902 the legislature not only specifically mentioned that section in both the title and section 15 but also designated section 2 of chapter 82, Laws of 1931, of which section 50–902 was merely a codification. This, said the court, removed any possibility of doubt as to the legislative purpose to repeal that particular section.

The court then went on to say that it did not appear why the legislature repealed section 50–902 of the dairy code and at the same time made no reference to the other 50-odd sections contained in it. However, the court took the view that it had not been the law-making body's intention to deprive the dairy industry of the protection which it had enjoyed for so many years, because it would undoubtedly have accomplished such purpose by repealing article 9 of chapter 50 of the

code instead of only one of its 54 sections. The conclusion was reached that chapter 105, the repealing act, did not transfer the duties of the dairy commissioner to the State department of health, and the court held that, under the above-quoted section 1–107 of the code, the petitioner, who was holding the office of dairy commissioner under section 50–902 when chapter 105 took effect, continued to hold it according to the tenure of section 50–902.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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Public Health Reports

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THE OCCURRENCE OF HYALINE SCLEROSIS AND CALCIFICATION OF BLOOD VESSELS IN RATS ON SULFAGUANIDINE

By FLOYD S. DAFT, *Senior Biochemist,* L. L. ASHBURN, *Passed Assistant Surgeon,* SAMUEL S. SPICER, *Assistant Surgeon,* and W. H. SEBRELL, *Surgeon, United States Public Health Service*

Sulfaguanidine has been used by Black, McKibbin, and Elvehjem (*1*); by Mackenzie, Mackenzie, and McCollum (*2*); and by Dann (*3*) in the diet of rats with the purpose of preventing or decreasing the synthesis of essential nutrients by the intestinal flora. Black et al. (*1*) state "The reduced growth on the basal diet plus 0.5% sulfaguanidine may be due to inhibition of intestinal synthesis of essential growth factors which liver extract supplies, or to a toxicity which is counteracted by a factor in liver extract. Results which indicate that the effect is due to inhibition of intestinal synthesis are shown * * *."

We wish to report at this time the finding of extensive hyaline sclerosis and calcification of blood vessels in 7 young rats observed in the course of some preliminary experiments with purified B complex deficient diets containing 1 percent of sulfaguanidine, supplemented with thiamin, riboflavin, pyridoxine, pantothenic acid, nicotinic acid, and choline, and given continuously for 62 to 192 days. This pathologic change has been found so far in the small arteries of the heart, lungs, kidney, pancreas, and the submucosa of the intestinal tract.

The location and degree of involvement are variable. The vessel wall is often completely replaced by a homogeneous or glassy material which is metachromatic or lightly basophilic with eosin and polychrome methylene blue. This glassy material as seen in routine paraffin sections is markedly shattered into variably sized and shaped plates. It forms an orange-brown lake with alizarin red S, it is brown, black marginally, when stained by the von Kossa method for the demonstration of insoluble calcium salts, and rarely shows associated deposition of hemosiderin.

These preliminary findings are being reported because sclerotic changes have not been described previously in experimental animals given sulfaguanidine. It is impossible for us at the present time to

state whether this pathologic condition has its basis in a dietary deficiency induced by sulfaguanidine, or whether the sulfaguanidine or a compound derived from it has contributed directly to the sclerotic changes.

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DENTAL STATUS OF ADULT MALE MINE AND SMELTER WORKERS[1]

By H. P. Brinton, *Associate Statistician, United States Public Health Service*, D. C. Johnston, *D. D. S.*, and E. O. Thompson, *D. D. S.*

Information regarding the dental status of adult males is scarce (*1*), although much has been written concerning dental conditions among school children. It was possible to include a detailed examination of oral conditions in connection with a study of bituminous coal mine workers, nonferrous metal mine workers, and smelter workers in the State of Utah which was made by the United States Public Health Service in cooperation with the State Board of Health in 1939. In all there were 2,365 dental examinations recorded which represent 83 percent of the schedules secured in the medical study. It is believed that these persons for whom dental records were obtained are representative of persons employed in the mines and smelters studied.

The dental record form used in this study was that originated by Klein and Palmer (*2*) with slight modifications. It is shown in figure 1. Each worker was examined in a good light with a mouth mirror and a well sharpened explorer. If necessary, any calculus or debris was cleaned away from the teeth so that an accurate check of gingival conditions could be made. Each examination, which took approximately 10 minutes, was performed by one of the authors. Comparability of results within this study is thereby assured, since only one person was responsible for recording the findings.

Table 1 shows the number and percent examined for each age group, by industry. It will be observed that in the metal mines there was a greater concentration of persons under 35 years of age than is found in the other two industries. Smelters showed a larger percentage of

[1] From the Division of Industrial Hygiene, National Institute of Health.
The data upon which this study is based were collected in connection with a field study made in cooperation with the Utah State Board of Health This field study dealt with the working environment and the health of workers in bituminous coal mines, nonferrous metal mines, and nonferrous metal smelters in Utah. All dental examinations were performed by Dr. Thompson.

workers in the older age groups. There was nearly the same percentage of coal mine workers and smelter workers 25–34 and 35–44 years of age. On the whole, the differences in age distribution are not sufficiently great to affect interindustry comparisons of dental conditions.

U. S. Public Health Service—Utah Study

Dental Record

No.______ Date______
Oral cavity______: Normal______ Diseased______
Gingivitis______: Mild______ Severe______
Pyorrhea______: Degree: ______ I______ II______ III______ IV______
Saliva______: Normal______ Viscid______ Ropy______ Odorous______
Evidence of metallic poisoning______. Lead______ Other______
Occlusion______: Type: ______ I______ II______ III______ IV______

C. Inc	L. Inc.	Cusp.	1st Bics.	2d Bics.	1st Mol.	2d Mol

Upper left

Upper Right

Lower Left

Lower Right

FIGURE 1.—Record form used in the dental survey. Each tooth or tooth position is represented by 2 boxes. In the left box is placed a symbol to show condition of the tooth, and in the right box a symbol to show the position of any caries, fillings, or other findings yielded by the tooth. For further details see publication mentioned in reference 2.

TABLE 1.—*Number and percent of workers given dental examinations according to age group, by industry*

Age group in years	Metal mines		Coal mines		Smelters	
	Number	Percent	Number	Percent	Number	Percent
All ages	690	100.0	459	100.0	1,216	100.0
15–24	83	12.0	70	15.2	113	9.3
25–34	308	44.6	155	33.8	395	32.5
35–44	162	23.5	131	28.5	347	28.5
45–54	90	13.1	82	17.9	256	21.1
55–64	47	6.8	21	4.6	105	8.6
Average age	36.0		36.5		39.0	

Number of teeth missing, filled, or with untreated dental caries.—The amount of dental caries experience observed in the permanent teeth per 100 men of particular age groups may be expressed in terms of the number of teeth with untreated dental caries, the number of extracted teeth (including teeth indicated for extraction), and the number of filled teeth. All three rates may be considered separately or may be combined into a single rate, known as the D. M. F.[2] rate. In calculating this rate each item is mutually exclusive with respect to any particular tooth. A tooth containing both a filling and one or more carious lesions is counted as a filled tooth. All teeth indicated for extraction are considered as missing teeth (*3*). Thus, the same tooth may not be counted more than once. The unit of measurement is the individual tooth, not the tooth surfaces. In each mouth the total number of teeth given consideration is 28. The four third molars are disregarded because of the difficulty of obtaining accurate information on many third molars without a radiodontic examination.

In previous studies the D. M. F. rate has usually been applied to school children, hence the problem of missing teeth, attributable to factors other than caries, has been of little importance. Among young persons the entire rate may be considered as representing caries experience without undue qualification. However, with respect to adults, especially persons over 35 years of age, the reason for missing teeth becomes more important. It can safely be assumed that an unknown proportion of the missing teeth was lost from causes other than caries. Only a specially designed survey of the particular group under study could determine this proportion accurately. Pyorrhea rather than decay is often the cause of lost teeth among older persons. For Utah metal mine, coal mine, and smelter workers 35–64 years of age, it was found that about two-thirds showed evidence of pyorrhea. Undoubtedly the edentulous condition of certain workers was due to this disease.

Table 2 shows the number of teeth missing, filled, and with untreated dental caries according to age group. The D. M. F. rate per 100 men for all ages is 1,446 among coal mine workers, 1,485 among metal mine workers, and 1,542 among smelter workers. It is observed that among young persons, metal mine workers and smelter workers have a slightly higher D. M. F. rate than coal mine workers; among workers 35–44 years of age all three industrial groups have nearly the same rate, while in the two oldest age groups coal mine and metal mine workers have a higher rate than smelter workers. There is a less rapid increase with age in the D. M. F. rate for smelter workers than for the other two industrial groups. Smelter workers have the most unfavorable rate in youth and the most favorable rate in the age group 45–64 years.

[2] Decayed, missing, filled.

TABLE 2.—*Number of teeth missing, filled, and with untreated dental caries according to age group by industry*

Age group, in years	Number of workers examined	Number of teeth— Total D. M. F.	Untreated dental caries	Missing	Filled	Number of teeth (per 100 men)— Total D. M. F.	Untreated dental caries	Missing	Filled
					Metal Mines				
All ages	690	10,244	1,878	5,794	2,572	1,485	272	840	373
15-24	83	889	301	235	353	1,071	363	283	425
25-34	308	3,967	1,011	1,629	1,327	1,288	328	529	431
35-44	162	2,476	372	1,533	571	1,528	230	946	352
45-54	90	1,833	154	1,418	261	2,037	171	1,576	290
55-64	47	1,079	40	979	60	2,296	285	2,083	128
					Coal Mines				
All ages	459	6,635	1,326	4,253	1,056	1,446	289	927	230
15-24	70	684	272	208	204	977	389	297	291
25-34	155	1,750	555	772	423	1,129	358	498	273
35-44	131	2,021	351	1,302	368	1,543	268	994	281
45-51	82	1,729	131	1,548	50	2,109	160	1,888	61
55-64	21	451	17	423	11	2,147	81	2,014	52
					Smelters				
All ages	1,216	18,749	2,901	10,937	4,911	1,542	239	899	404
15-24	113	1,300	468	318	514	1,150	414	281	455
25 34	395	5,261	1,264	1,961	2,036	1,331	320	496	515
35-44	347	5,453	737	3,259	1,457	1,571	212	939	420
45-54	256	4,607	352	3,548	707	1,800	138	1,386	276
55 64	105	2,128	80	1,851	197	2,027	76	1,763	188

An examination of 3,351 male employees of the Metropolitan Life Insurance Company, as reported by Hollander and Dunning (*4*), yielded the following D. M. F. rates per 100 persons:

Age	Number of persons	Number of affected and missing teeth	D M F rate
All ages	3,351	58,741	1,753
15-24	1,441	20,519	1,424
25-34	804	15,081	1,876
35-44	537	10,731	1,998
45-54	413	8,766	2,123
55-64	156	3,644	2,336

It will be observed that these rates which are based on 32 teeth (excluding unerupted teeth) do not differ greatly from the rates for Utah coal mine, metal mine, and smelter workers for the two oldest age groups, but for the younger age groups the male life insurance employees have much higher rates. The effect of this is to make the increase with age less rapid than among the Utah workers.

It will be noted in each industry that the number of permanent teeth with untreated dental caries per 100 men becomes steadily

smaller with advancing age. This is most marked among smelter workers and least marked among coal mine workers. On the other hand, the number of missing teeth per 100 men increases rapidly among the older age groups. It is obvious that a neglected tooth is likely at a later age to become a missing tooth and hence can appear no longer in the classification of untreated dental caries.

A dental study of a group of pottery workers showed the same tendency for unfilled carious teeth to become less common with advancing age, while missing teeth became more common (*5*).

The maximum rate for filled teeth is reached in the 25–34-year age group among metal mine and smelter workers, but occurs a decade earlier, in the 15–24 year group, among coal mine workers. For each age group filled teeth are less common among coal mine workers than among either of the other two industrial groups. Teeth with untreated dental caries are found to be slightly more frequent among coal mine workers of all ages than among the others. However, despite this adverse influence, the total D. M. F. rate of coal mine workers is not unfavorable, suggesting the presence of other environmental factors which might possible compensate for the apparently lesser amount of dental care.

As previously explained, the number of missing teeth per 100 men is based on a count which includes persons who have lost some of their teeth as well as persons who have lost all their teeth. This loss cannot be attributed solely to caries There is remarkably little difference in the age-specific rates for missing teeth in the industries studied, especially so among the first three age groups. For example, in the 35–44-year age group, the industry with the highest rate was less than 6 percent greater than the industry with the lowest rate. After 45 years of age the rate for missing teeth rose more rapidly for coal mine and metal mine workers than for smelter workers

The number of missing teeth compared with all carious, filled, or missing teeth (or M/D. M. F.) was highest at each age group for coal mine workers, ranging from 30.4 percent for persons 15–24 years of age to 93.8 percent for persons 55–64 years of age. In other words, among the 21 coal mine workers in the oldest age group there were 423 teeth missing compared with 28 defective teeth which remained. Moreover, only 137 teeth were neither affected by decay nor lost. Among metal mine workers in the same age group missing teeth constituted 90.7 percent of all affected teeth and among smelter workers there were 87.0 percent missing. Since the rate for missing teeth is cumulative, it is not surprising that the position of the three industrial groups at the youngest age is maintained throughout all succeeding age groups. It would appear that coal mine workers at each age group are most likely to lose teeth which become affected, although they have a smaller proportion of teeth decayed (teeth with untreated

dental caries plus filled teeth). Both metal mine and smelter workers have a greater proportion of teeth decayed, but not such a large percentage of those affected are lost as among coal mine workers.

Missing teeth may be considered from the viewpoint of persons who are not edentulous. The following table shows the number of missing teeth per 100 men who had some teeth remaining:

Age	Metal mines	Coal mines	Smelters
All ages	519	549	543
15-24	283	297	281
25-34	437	453	393
35-44	575	687	633
45-54	932	930	778
55-64	1,115	737	855

The above rates compared with the rates including edentulous persons are the same for the first age group because in this group no individual had all teeth missing. Among persons of older age, differences in the relative position of the three industries are not great except for the decline in rate for coal mine workers between 45–54 and 55–64 years of age The omission of edentulous persons reduces the rapidity of rise in rate with age, since most of the persons so affected are over 45 years

Edentulous workers—Edentulous workers numbered 366, or 15 5 percent of all persons examined. According to industry, as shown in table 3, there were 16 8 percent of the workers in coal mines who had lost all teeth in both jaws, 15 8 percent of the smelter workers, and 14 1 percent of the workers in metal mines who were so affected. A study of 228 male pottery workers showed a slightly more favorable experience, with 12 3 percent of the workers having both jaws edentulous (*5*).

TABLE 3 —*Number and percent of edentulous workers according to age group by industry*

Age group in years	Number of edentulous workers			Percent of workers having edentulous mouths [1]		
	Metal mines	Coal mines	Smelters	Metal mines	Coal mines	Smelters
All ages	97	77	192	14 1	16 8	15.8
15-24	0	0	0	0	0	0
25 34	12	3	17	3 9	1 9	4 3
35 44	27	19	49	16 7	14 5	14 1
45-54	31	42	77	34 4	51 2	30 1
55 64	27	13	49	57 4	61 9	46 7

[1] The populations upon which these percentages are based are shown in table 1

No edentulous workers were found in the age group 15–24 years. In the age groups 25–34 and 35–44, which taken together represented

over 60 percent of the workers examined in each industry, edentulous persons comprised between 7 and 8 percent, compared with 4.8 percent among pottery workers. When considered by 10-year age groups it is noted that coal mine workers have a more favorable experience when young than either metal mine or smelter workers, have about the same incidence as the others when 35–44 years, and have a definitely unfavorable experience after 45 years of age. This may be related to the finding that among the younger coal mine workers there were more teeth with untreated dental caries and less filled teeth. Less care when young might affect the loss of all teeth when older. All three industrial groups show a rapid increase with age in the percent edentulous, but this is most marked among coal mine workers. For example, between the age groups 35–44 and 45–54 years the percentage edentulous among coal mine workers increases more than three times, while in the other two industries during the same period the rate is only slightly more than doubled.

In the present study 93 percent of the edentulous workers were wearing artificial dentures. Among male pottery workers there were 99 percent with dentures.

Gingivitis.—Gingivitis as here defined is any general inflammation of the gingival tissue. It was diagnosed as mild when characterized by a slight degree of swelling, redness, and soreness, but no pus, and as severe when there was a pronounced swelling, redness, and soreness with pus present.

TABLE 4.—*Number and percent of workers with gingivitis, in two age groups, by industry*

Industry	Number of workers examined	Percent affected			Number affected		
		Degree of gingivitis			Degree of gingivitis		
		Mild	Severe	Mild and severe	Mild	Severe	Mild and severe
	15–34 years						
Metal mines	379	44 6	9 5	54 1	169	36	205
Coal mines	222	37 4	5.4	42 8	83	12	95
Smelters	491	42.6	11.0	53.6	209	54	263
	35–64 years						
Metal mines	214	43.5	34.1	77.6	93	73	166
Coal mines	160	45 0	33.1	78.1	72	53	125
Smelters	533	44.8	31.3	76.1	239	167	406
	All ages						
Metal mines	593	44 2	18 4	62 6	262	109	371
Coal mines	382	40 6	17.0	57.6	155	65	220
Smelters	1,024	43.7	21 6	65.3	448	221	669

Table 4 shows the percentage of workers affected with mild and with severe gingivitis. The older group, representing persons 35–64 years of age, shows a much greater prevalence of the severe type of gingivitis than does the younger group, but for the mild type age appears to make little difference. Among persons 15–34 years of age there was less gingivitis and it was less severe for coal mine workers than for the other two industrial groups. In the older age group there was no appreciable difference by industry in the percentage of persons affected with either mild or severe gingivitis.

Peridontoclasia (pyorrhea alveolaris).—Peridontoclasia or pyorrhea is described as a purulent inflammation of the dental periosteum. It is a chronic infection which is characterized by the breaking down and destruction of the alveolar tissue. Pockets are formed between the gum tissue and the tooth root.

In this study pyorrhea-affected workers were divided into four classes:

Class I. Pockets up to 3 mm. deep around less than half the full complement of teeth.

Class II. Pockets up to 3 mm. deep around more than half of the teeth.

Class III. Pockets more than 3 mm. deep around less than half of the teeth.

Class IV. Pockets more than 3 mm. deep around more than half of the teeth. This group includes all cases in which the remaining teeth are hopelessly pyorrhetic

TABLE 5.—*Number and percent of workers with pyorrhea, in two age groups, by industry*

Industry	Number of workers examined	Percent affected					Number affected				
		Class of pyorrhea					Class of pyorrhea				
		I	II	III	IV	All classes	I	II	III	IV	All classes
15-34 years											
Metal mines	379	14.5	12.1	4.0	2.6	33.2	55	46	15	10	126
Coal mines	222	16.2	7.7	4.5	.9	29.8	36	17	10	2	65
Smelters	491	26.5	7.7	4.7	.8	39.7	130	38	23	4	195
35-64 years											
Metal mines	214	17.8	14.0	11.7	19.6	63.1	38	30	25	42	135
Coal mines	160	16.2	13.1	19.4	20.0	68.7	26	21	31	32	110
Smelters	533	26.1	13.1	16.5	10.9	66.6	139	70	88	58	355
All ages											
Metal mines	593	15.7	12.8	6.7	8.8	44.0	93	76	40	52	261
Coal mines	382	16.3	9.9	10.7	8.9	45.8	62	38	41	34	175
Smelters	1,024	26.3	10.5	10.8	6.1	53.7	269	108	111	62	550

Table 5 shows the number of persons affected according to these four classes of pyorrhea. Among persons 15–34 years of age, 29.3

percent of the coal mine workers, 33.2 percent of the metal mine workers, and 39.7 percent of the smelter workers had pyorrhea. The favorable showing of coal mine workers when analyzed by class of pyorrhea is influenced by the fact that this group had 20.7 percent with less than half of the teeth affected (Classes I and III), compared with 31.2 percent for smelter workers, and it had 8.6 percent with more than half of the teeth affected (Classes II and IV), compared with 14.7 percent for metal mine workers. Edentulous persons do not enter into this calculation, but if they were included the position of coal mine workers would be still more favorable.

For all classes of pyorrhea in each industry, the percentage affected was greater among persons 35–64 years of age than in the younger age group. This increase was most pronounced for Class IV (pockets more than 3 mm. deep around more than half of the teeth) and for Class III (pockets more than 3 mm. deep around less than half of the teeth). Thus it is evident that both the proportion of teeth affected and the severity of the infection increase with age. The percentage in Class I (pockets up to 3 mm. deep around less than half of the teeth) shows almost no change with age.

When the proportions affected according to class of pyorrhea are compared by industry for persons 35–64 years of age it is observed that Class I is more common and Class IV less common among smelter workers than among the other two industrial groups. Class II is nearly the same for all three industries. Class III is less common among metal workers. Because of a relatively high incidence of Class III and Class IV pyorrhea, coal mine workers have a slightly higher percentage of the total for pyorrhea in the older age group.

Lead line. —The lead line, or Burtonian line, was observed in certain groups of the workers studied. It is characterized by a fine line of blue-black granules which are deposited immediately below the gingival crest. Aub (*6*) states that it is due to a deposit of lead sulfide about the blood vessels in the tips of the interdental papillae. Thus, it is more easily noticed in persons who have peridontoclasia. In a lead smelter there were 19 persons who showed a lead line; all also had gingivitis and all but one had pyorrhea.

It is possible that in some healthy mouths the lead line was not detected. In edentulous persons where the gums had healed over the destroyed alveolar process no lead line was found, even when it had been present previously.

Among the 40 persons (none edentulous) employed in a metal mine producing lead carbonate ores who showed a lead line, all but one had gingivitis and 72 percent were found to have pyorrhea. The dental caries experience for this group was favorable as compared with all metal mine workers, the D. M. F. rates per 100 men being 1,087 and 1,590, respectively. For persons under 35 years of age the corre-

sponding rates were 1,004 and 1,242. It would appear that persons showing a lead line are likely to have gingivitis and pyorrhea, but with respect to untreated dental caries, missing teeth, and filled teeth, considered together, a lead line is not associated with unfavorable experience.

In certain metal mines and smelters it is known that many of the workers were exposed to appreciable concentrations of lead. None of the persons working only in coal mines are thought to have had a lead exposure. Possibly this factor, common to the environment of metal mine and smelter workers but absent from the environment of coal mine workers, had some influence on the generally more favorable experience of the latter group, 15–34 years of age, with respect to the occurrence of dental caries, loss of teeth, gingivitis, and pyorrhea.

According to Aub, Fairhall, Minot, and Reznikoff (7), lead workers commonly have "bad teeth." It is possible that lead, even in comparatively small concentrations, may exert an adverse influence on the health of the gums For example, it was observed that among persons 15–34 years of age working in a smelter which processes lead ores, 50.4 percent showed pyorrhea, while in a copper smelter 35.8 percent were so affected

SUMMARY

Dental examinations were made on 2,365 adult male workers in three industries in the State of Utah. It was found that the D. M. F. rate (number of teeth with untreated dental caries, plus filled teeth, plus missing teeth) per 100 men was 1,446 among coal mine workers, 1,485 among metal mine workers, and 1,542 among smelter workers. When the component parts of this rate were considered, it appeared that coal mine workers were most likely to lose teeth once they had become affected, but they had a smaller proportion of decayed teeth (teeth with untreated dental caries plus filled teeth) than either metal mine or smelter workers The lower D. M. F. rate for all coal mine workers was due to the more favorable experience of this group under 35 years of age. Above this age, workers in the other two industries had about the same D. M. F. rates as coal mine workers.

There was a smaller proportion of edentulous persons among coal mine workers 25–34 years of age than among metal mine or smelter workers of the corresponding age groups. Among older persons the position was reversed, and coal mine workers showed the highest proportion of edentulous.

Among persons 15–34 years of age there was less gingivitis and it was less severe for coal mine workers than for the other two industrial groups. The older age group showed little difference by industry.

The incidence of pyorrhea, likewise, was favorable among the younger group of coal mine workers, but not among the older workers.

It was shown that persons who were found to have a lead line had a much greater incidence of gingivitis and pyorrhea but lower D. M. F. rates than all workers in these industries. It is suggested that the generally more favorable dental experience of coal mine workers 15–34 years of age may be partially due to the circumstance that they presumably have not been exposed to lead, while certain metal mine and smelter workers have had lead exposures.

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REPORT ON MARKET-MILK SUPPLIES OF STANDARD MILK ORDINANCE COMMUNITIES[1]

Compliance of the Market-Milk Supplies of Certain Standard Milk Ordinance Communities With the Grade A Pasteurized and Grade A Raw Milk Requirements of the Public Health Service Milk Ordinance and Code. as Shown by Compliance (Not Safety) Ratings of 90 Percent or More Reported by the State Milk-Sanitation Authorities During the Period January 1, 1940, to December 31, 1941

The accompanying list gives the semiannual revision of the list of certain Standard Milk Ordinance communities in which the pasteurized market milk is both produced and pasteurized in accordance with the Grade A pasteurized milk requirements of the Public Health Service Milk Ordinance and Code and in which the raw market milk sold to the final consumer is produced in accordance with the Grade A raw milk requirements of said ordinance and code, as shown by ratings of 90 percent or more reported by State milk-sanitation authorities.

These ratings are not a complete measure of safety, but represent the degree of compliance with the Grade A requirements of the Public

[1] From the States Relations Division.

Health Service Milk Ordinance and Code. Safety estimates should also take into account the percentage of milk pasteurized, which is given in the following tables.

The milk ordinance recommended by the Public Health Service is now in effect in hundreds of communities ranging in population from 1,000 to 3,500,000 and located in 35 States.

The primary reason for publishing the rating lists from time to time is to encourage these communities to attain and maintain a high level of excellence in the enforcement of this ordinance. No comparison with communities operating under other milk ordinances is intended or implied.

It is emphasized that the Public Health Service does not intend to imply that only those communities on the list are provided with high-grade milk supplies. Some communities which have high-grade milk supplies are not included, because arrangements have not been made for the determination of their ratings by the State milk-sanitation authority. In other cases the ratings which have been determined are now more than 2 years old and have therefore lapsed. In still other communities with high-grade milk supplies there seems, in the opinion of the community, to be no local necessity nor desire for rating or inclusion in the list, nor any reasonable local benefit to be derived therefrom.

The rules under which a community is included in this list are as follows:

(1) All ratings must have been determined by the State milk-sanitation authority in accordance with the Public Health Service rating method (Pub. Health Rep., **53:** 1386 (1938). Reprint No. 1970), based upon the Grade A pasteurized milk and the Grade A raw milk requirements of the Public Health Service Milk Ordinance and Code.

(2) No community will be included in the list unless both its pasteurized milk and its raw milk ratings are 90 percent or more. Communities in which only raw milk is sold will be included if the raw milk ratings are 90 percent or more. Communities which receive, without local inspection, milk from other sheds will be included in the list only if the locally inspected supply, as well as the shipped-in supply, shows a rating of 90 percent or more.

(3) The rating used will be the latest rating submitted to the Public Health Service, but no rating will be used which is more than 2 years old. In order to promote continuous rigid enforcement rather than occasional "clean-up campaigns" it is suggested that when the rating of a community on the list falls below 90 percent no resurvey be made for at least 6 months, resulting in removal from the next semiannual list.

(4) The Public Health Service will make occasional check surveys of cities for which ratings of 90 percent or more have been reported by the State. If such check rating is less than 90 percent but not less than 85, the city will be removed from the 90-percent list after 6 months unless a resurvey submitted by the State during this probationary interim shows a rating of 90 percent or more. If, however, such check rating is less than 85 percent, the city will be removed from the list immediately. If the check rating is 90 percent or more, the city will be retained on the list for a period of 2 years from the date of the check survey unless a subsequent rating submitted during this period warrants its removal.

Communities are urgently advised to bring their ordinances up to date at least every 5 years, since ratings will be made on the basis of later editions if those adopted locally are more than 5 years old.

Communities which are not now on the list and desire to be rated should request the State milk-sanitation authority to determine their ratings and, if necessary, should improve their status sufficiently to merit inclusion in the list.

Communities which are now on the list should not permit their ratings to lapse, as ratings more than 2 years old cannot be used.

State milk-sanitation authorities who are not now equipped to determine municipal ratings are urged, in fairness to their communities, to equip themselves as soon as possible. The personnel required is small, as in most States one milk specialist is sufficient for the work.

TABLE 1.—*Standard Milk Ordinance communities in which all market milk is pasteurized. In these communities market milk complies with the Grade A pasteurized milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by pasteurized milk ratings of 90 percent or more* [1]

Community	Percentage of milk pasteurized	Date of rating	Community	Percentage of milk pasteurized	Date of rating
ILLINOIS			MINNESOTA		
Aurora	100	May 3 1940	Rochester	100	May 29 1941
Brooklyn [2]	100	Oct 8 1941	Winona	100	September 1940
Cahokia [2]	100	Do			
Canteen	100	Do	MISSOURI		
Centerville [2]	100	Do			
Champaign	100	July 23 1941	St Louis	100	June 7 1940
East St Louis [2]	100	Oct 8 1941			
Elgin	100	July 12 1940	NORTH CAROLINA		
Fairmont City [2]	100	Oct 8 1941	Clinton	100	June 5 1940
National City [2]	100	Do	Fort Bragg	100	June 4 1940
Stites [2]	100	Do	Greenville	100	June 15, 1940
Washington Park	100	Do	Sylva	100	May 10, 1940

[1] Note particularly the percentages of milk pasteurized in the various communities listed in these tables. This percentage is an important factor to consider in estimating the safety of a city's milk supply.
[2] Part of East Side Health District.

The inclusion of a community in this list means that the pasteurized milk sold in the community, if any, is of such a degree of excellence that the weighted average of the percentages of compliance with the

various items of sanitation required for Grade A pasteurized milk is 90 percent or more and that, similarly, the raw milk sold in the community, if any, so nearly meets the requirements that the weighted average of the percentages of compliance with the various items of sanitation required for Grade A raw milk is 90 percent or more. However, high-grade pasteurized milk is safer than high-grade raw milk, because of the added protection of pasteurization. To secure this added protection, those who are dependent on raw milk can pasteurize the milk at home in the following simple manner: Heat the milk over a hot flame to 165° F., stirring constantly; then immediately place the vessel in cold water and continue stirring until cool.

TABLE 2.—*Standard Milk Ordinance communities in which some market milk is pasteurized. In these communities the pasteurized market milk complies with the Grade A pasteurized milk requirements and the raw market milk complies with the Grade A raw milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by pasteurized and raw milk ratings, respectively, of 90 percent or more* [1]

[NOTE.—All milk should be pasteurized or boiled, either commercially or at home, before it is consumed. See text for home method]

Community	Percentage of milk pasteurized	Date of rating
ALABAMA		
Dothan	84	June 23, 1941
Tuscaloosa	86	May 24, 1940
ARKANSAS		
El Dorado	39	June 1940
Fayetteville	60	November 1940
Fort Smith	48	September 1940
Jonesboro	59	October 1940
Little Rock	56	October 1941
Pine Bluff	43	November 1941
Texarkana	62	September 1941
COLORADO		
Pueblo	59	April 1941
FLORIDA		
Coral Gables	97	April 1940
Dania	95	Mar. 28, 1940
Deerfield	95	Do
Fort Lauderdale	95	Do
Hallandale	95	Do.
Hollywood	95	Do
Jacksonville	78	April 1941
Miami	97	April 1940
Pompano	95	Mar. 28, 1940
Tallahassee	50	September 1941.
GEORGIA		
Statesboro	40	Mar. 14, 1940
ILLINOIS		
Chicago	99.8	Apr. 11, 1941
Decatur	92	Oct. 3, 1940
Evanston [2]	99.9	Apr. 17, 1940
Glencoe	99.8	Apr. 11, 1940.
Highland Park	99.8	Do
Kenilworth	99.8	Do
Lake Bluff	99.8	Do
Lake Forest	99.8	Do
Oak Park	99.8	Jan. 17, 1941
Peoria	97	May 23, 1940.
Waukegan	99.9	Apr. 3, 1940
Winnetka	99.8	Apr. 11, 1940
IOWA		
Washington	74	Jan. 7, 1941
KANSAS		
Chanute	40	May 1940
Lawrence	69	Do
Wellington	54	April 1940
Wichita	75	December 1939
KENTUCKY		
Bowling Green	68	June 12, 1941
Glasgow	52	June 1941
Hazard	40	December 1941
Lexington	66	September 1940
Louisville	99.2	November 1940
Owensboro	80	July 23, 1941
Paducah	83	February 1941
Richmond	28	Jan. 14, 1941
Somerset	9	November 1940.

[1] Note particularly the percentage of milk pasteurized in the various communities listed in these tables. This percentage is an important factor to consider in estimating the safety of a city's milk supply.
[2] Has not adopted the milk ordinance recommended by the Public Health Service.

TABLE 2—*Standard Milk Ordinance communities in which some market milk is pasteurized In these communities the pasteurized market milk complies with the Grade A pasteurized milk requirements and the raw market milk complies with the Grade A raw milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by pasteurized and raw milk ratings, respectively, of 90 percent or more*—Continued

[NOTE —All milk should be pasteurized or boiled, either commercially or at home, before it is consumed See text for home method]

Community	Percentage of milk pasteurized	Date of rating
LOUISIANA		
Monroe	41	Mar 7, 1941
MICHIGAN		
Crystal Falls	41	July 24 1940
Iron River	51	Do
Stambaugh	51	Do
MINNESOTA		
Moorhead	88	Feb 14 1941
MISSOURI		
Clayton	([3])	Dec 14 1939
Ferguson	([3])	Do
Glendale	([3])	Do
Kirkwood	([3])	Do
Maplewood	([3])	June [illegible] 1940
University City	([3])	Dec 14 1939
Webster Groves	([3])	Do
NEW MEXICO		
Albuquerque	7[illegible]	Dec 20 1941
Las Vegas	[illegible]	July 18 1941
Santa Fe	44	December 1939
NORTH CAROLINA		
Asheville	6[illegible]	June 14 1940
Black Mountain	24	May 21 1940
Durham	91	Oct 1940
Fayetteville	[illegible]	June 4 1940
Greensboro	86	Aug 1940
Goldsboro	[illegible]2	June 5 1940
Hendersonville	73	June 26 1940
Hope Mill	2	June 4 1940
Kinston	12	July 9 1940
Lumberton	36	May 29 1940
Mars Hill	15	Jan 10 1941
Rockingham	53	Apr 9 1940
Roxboro	36	July 2 1940
Waynesville	60	May 9 1940
Weaverville	40	June 5 1940
NORTH DAKOTA		
Fargo	90 8	Feb 16 1941
Valley City	32 5	July 24 1941
OHIO		
Athens	80	July 6 1940
OKLAHOMA		
Ada	[illegible]	June 27 1940
Bartlesville	4[illegible]	Dec 19 1939
Blackwell	38	Nov 15 1941
Muskogee	82	June 4 1940
Okmulgee	60	July 22 1940
Seminole	63	Mar 26 1940
OKLAHOMA—Con		
Tulsa	74	Apr 6, 1940
Wewoka	[illegible]2	July 8 1940
OREGON		
Astoria	78	June 20 1941
Eugene	60	Nov 1 1940
Portland	82	Apr 3 1940
Seaside	68	June 20 1941
SOUTH CAROLINA		
Walterboro	26	Dec 6 1939
TENNESSEE		
Bristol	80	December 1941
Memphis	90	December 1940
TEXAS		
Amarillo	78	Aug 12 1940
Big Spring	[illegible]3	Aug 8 1940
Brownwood	64	May 31 1941
Bryan	14	July 20 1940
Canyon	42	Aug 9 1940
Crystal City	39	June 27 1940
Dallas	85	Dec 7 1940
Fort Worth	82	June 19 1940
Jacksonville	85	May 2 1940
Lamesa	47	Mar 26 1941
Lubbock	80	Nov 21 1941
Lufkin	43	Aug 1 1940
Palestine	23	Jan 30 1940
San Angelo	65	May 13 1940
San Antonio	82	June 28 1940
Seguin	18	Sept 10 1941
Sherman	53	Mar 25 1941
Texarkana	45	Feb 4 1941
Tyler	42	June 12 1940
UTAH		
Ogden	93	Sept 15 1941
Salt Lake City	96	Dec 24 1940
VIRGINIA		
Abingdon	38	Mar 21, 1941
Bristol	80	December 1941
Pulaski	99	Dec 18 1941
South Boston	75	May 29 1941
Waynesboro	98	Nov 15 1941
Williamsburg	55	May 26 1941
WASHINGTON		
Camas	6	June 18 1941
Pullman	87	Aug 26 1941
Vancouver	28	Nov 28 1940
Walla Walla	61	May 28 1941
Yakima	[illegible]2	May 14 1941
WYOMING		
Casper	67	Oct 10 1941
Cheyenne	75	Dec 24 1941

[3] The percentage of the total milk supply pasteurized cannot be accurately determined owing to the overlapping of milk routes

TABLE 3.—*Standard Milk Ordinance communities in which no market milk is pasteurized, but in which the raw market milk complies with the Grade A raw milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by raw milk ratings of 90 percent or more* [1]

[NOTE.—All milk should be pasteurized or boiled, either commercially or at home, before it is consumed. See text for home method]

Community	Date of rating	Community	Date of rating
ALABAMA		NORTH CAROLINA—continued	
Bridgeport	May 27, 1941.	Jackson	July 16, 1940.
Demopolis	Oct. 23, 940	Kenansville	May 23, 1940.
Lanett	Mar 19, 1940.	Lillington	June 6, 1940.
Scottsboro	May 27, 1941	Mount Olive	June 5, 1940
Stevenson	Do.	Murfreesboro	July 17, 1940.
		Parmele	June 20, 1940.
FLORIDA		Raeford	May 20, 1940.
		Red Springs	May 29, 1940.
Apalachicola	January 1940	Rich Square	July 16, 1940.
		Robersonville	June 20, 1940
KANSAS		Rosehill	May 23, 1940.
Horton	June 1940	Scotland Neck	July 16, 1940.
		Wallace	May 23, 1940.
KENTUCKY		Warsaw	Do
Owenton	November 1941.	Weldon	July 16, 1940
		Williamston	June 20, 1940.
MISSOURI		Winton	July 17, 1940
Brentwood	June 7, 1940	TEXAS	
		Colorado	Nov 13, 1941
NORTH CAROLINA		Del Rio	June 29, 1940
Angier	June 6, 1940	VIRGINIA	
Bethel	May 15, 1940	Blackstone	May 29, 1941.
Calypso	May 23, 1940	Boydton	Apr 4, 1941.
Coats	June 6, 1940	Lawrenceville	Oct. 23, 1941.
Dunn	Do		
Erwin	Do	WEST VIRGINIA	
Faison	May 23, 1940		
Farmville	May 15, 1940	Grantsville	May 12, 1941.

[1] Note particularly the percentage of milk pasteurized in the various communities listed in these tables. This percentage is an important factor to consider in estimating the safety of a city's milk supply.

NOTIFIABLE DISEASES IN THE UNITED STATES, 1940

Morbidity and Mortality Summaries for Certain Important Communicable Diseases

The Public Health Service has recently issued a compilation of morbidity and mortality data for the United States, by States and months, for a group of important notifiable diseases as reported by State health authorities in 1940.[1] A summary of this compilation is presented here, which includes case and death rates, case fatality rates, and for some diseases the estimated expectancy (median for the years 1933 to 1939, inclusive) for purposes of comparison.

Some States do not report cases of certain communicable diseases or are required to report cases only when the disease is epidemic (influenza, for example), while in other instances the case reports are manifestly incomplete, a few States reporting more deaths than cases. Therefore, in some instances the number of States included for the different diseases and in some items for a particular disease are not

[1] The Notifiable Diseases—Prevalence in States, 1940 Supplement 166 to the Public Health Reports. Government Printing Office, Washington, 1941

the same. For a few diseases the reports of both cases and deaths were considered sufficiently complete to include the 48 States and the District of Columbia.

In comparing the numbers of cases reported in 1940 with the estimated expectancy based on reports for prior years, or with the figures for any particular earlier year, it should be borne in mind that there has been a gradual improvement in the reporting of communicable diseases. In the rates the factor of population increase is eliminated, and rates are therefore of greater value for comparative purposes. A large increase in the case rate is likely to represent an actual increase in the prevalence of the disease.

The populations used are estimates as of July 1, 1940, based on the enumerated populations of the 1940 census as of April 1, 1940, and the 1930–40 intercensal changes.

SUMMARY

CHICKENPOX (38E) *

47 States (furnishing complete reports of cases and deaths).[1]	
Cases reported, 1940 (population 129,054,000)	279,152
Estimated expectancy based on years 1933–39	264,863
Cases per 100,000 inhabitants, 1940	216.3
Cases per 100,000 inhabitants, estimated expectancy	211.4
Deaths registered, 1940	88
Deaths per 100,000 inhabitants, 1940	0.1
Cases reported for each death registered, 1940	3,172
48 States [1]	
Cases reported, 1940 (population 131,892,000)	280,300
Cases per 100,000 inhabitants, 1940	212.5

DIPHTHERIA (10)

48 States [1]	
Cases reported, 1940 (population 131,892,000)	15,536
Estimated expectancy based on years 1933–39	31,783
Cases per 100,000 inhabitants, 1940	11.8
Cases per 100,000 inhabitants, estimated expectancy	24.8
Deaths registered, 1940	1,467
Deaths per 100,000 inhabitants, 1940	1.1
Cases reported for each death registered, 1940	11

DYSENTERY (AMEBIC) (27B)

30 States (furnishing complete reports of cases and deaths).[1]	
Cases reported, 1940 (population 110,012,000)	3,034
Cases per 100,000 inhabitants, 1940	2.8
Deaths registered, 1940	199
Deaths per 100,000 inhabitants, 1940	0.2
Cases reported for each death registered, 1940	15
43 States [1]	
Deaths registered, 1940 (population 125,064,000)	257
Deaths per 100,000 inhabitants, 1940	0.2

DYSENTERY (BACILLARY) (27A)

31 States (furnishing complete reports of cases and deaths) [1]	
Cases reported, 1940 (population 102,455,000)	19,731
Cases per 100,000 inhabitants, 1940	19.3
Deaths registered, 1940	764
Deaths per 100,000 inhabitants, 1940	0.7
Cases reported for each death registered, 1940	26
43 States [1]	
Deaths registered, 1940 (population 125,064,000)	901
Deaths per 100,000 inhabitants, 1940	0.7

*Figures in parentheses in the subheadings are disease title numbers from the International List of Causes of Death, 1938.

[1] The District of Columbia is also included but not counted as a State.

ENCEPHALITIS, EPIDEMIC OR LETHARGIC (37)

26 States (furnishing complete reports of cases and deaths).[1]	
Cases reported, 1940 (population 57,671,000)	791
Cases per 100,000 inhabitants, 1940	1.4
Deaths registered, 1940	313
Deaths per 100,000 inhabitants, 1940	0.5
Cases reported for each death registered, 1940	2.527
48 States.[1]	
Deaths registered, 1940 (population 131,892,000)	789
Deaths per 100,000 inhabitants, 1940	0.6

GONORRHEA (25)

47 States[1]	
Cases reported, 1940 (population 121,985,000)	179,989
Cases per 100,000 inhabitants, 1940	147.6

INFLUENZA (33)

39 States (furnishing complete reports of cases and deaths):[1]	
Cases reported, 1940 (population 97,231,000)	428,640
Cases per 100,000 inhabitants, 1940	440.8
Deaths registered, 1940	17,430
Deaths per 100 000 inhabitants, 1940	17.9
Cases reported for each death registered, 1940	24.592
48 States:[1]	
Deaths registered, 1940 (population 131,892,000)	20,328
Deaths per 100,000 inhabitants, 1940	15.4

MALARIA (28)

41 States (furnishing complete reports of cases and deaths):	
Cases reported, 1940 (population 127,399,000)	78,129
Cases per 100,000 inhabitants, 1940	61.3
Deaths registered, 1940	1,392
Deaths per 100,000 inhabitants, 1940	1.1
Cases reported for each death registered, 1940	56
48 States[1]	
Deaths registered, 1940 (population 131,892,000)	1,393
Deaths per 100,000 inhabitants, 1940	1.1

MEASLES (35)

48 States[1]	
Cases reported, 1940 (population 131,892,000)	291,162
Cases per 100,000 inhabitants, 1940	220.8
Deaths registered, 1940	681
Deaths per 100,000 inhabitants, 1940	0.5
Cases reported for each death registered, 1940	428

MENINGITIS, MENINGOCOCCUS (6)

43 States (furnishing complete reports of cases and deaths).[1]	
Cases reported, 1940 (population 126,962,000)	1,638
Estimated expectancy based on years 1933-39	3,307
Cases per 100,000 inhabitants, 1940	1.3
Cases per 100,000 inhabitants, estimated expectancy	2.7
Deaths registered, 1940	601
Deaths per 100,000 inhabitants, 1940	0.5
Cases reported for each death registered, 1940	2.725
48 States[1]	
Deaths registered, 1940 (population 131,892,000)	628
Deaths per 100,000 inhabitants, 1940	0.5

MUMPS (44C)

42 States (furnishing complete reports of cases and deaths):	
Cases reported, 1940 (population 101,287,000)	116,608
Estimated expectancy based on years 1933-39	122,714
Cases per 100,000 inhabitants, 1940	115.1
Cases per 100,000 inhabitants, estimated expectancy	124.4
Deaths registered, 1940	92
Deaths per 100,000 inhabitants, 1940	0.1
Cases reported for each death registered, 1940	1,267
45 States[1]	
Deaths registered, 1940 (population 113,601,000)	104
Deaths per 100,000 inhabitants, 1940	0.1

PELLAGRA (69)

21 States (furnishing complete reports of cases and deaths):[1]	
Cases reported, 1940 (population 52,710,000)	8,895
Cases per 100,000 inhabitants, 1940	16.9
Deaths registered, 1940	1,700
Deaths per 100,000 inhabitants, 1940	3.2
Cases reported for each death registered, 1940	5.232
47 States[1]	
Deaths registered, 1940 (population 118,391,000)	2,040
Deaths per 100,000 inhabitants, 1940	1.7

[1] The District of Columbia is also included but not counted as a State.

PNEUMONIA (ALL FORMS) (107–109)

33 States (furnishing complete reports of cases and deaths):[1]	
Cases reported, 1940 (population 103,563,000)	141,213
Cases per 100,000 inhabitants, 1940	136.4
Deaths registered, 1940	55,940
Deaths per 100,000 inhabitants, 1940	54.0
Cases reported for each death registered, 1940	2.524
48 States:[1]	
Deaths registered, 1940 (population 131,892,000)	72,239
Deaths per 100,000 inhabitants, 1940	54.8

POLIOMYELITIS (36)

48 States:[1]	
Cases reported, 1940 (population 131,892,000)	9,826
Estimated expectancy based on years 1933–39	4,428
Cases per 100,000 inhabitants, 1940	7.5
Cases per 100,000 inhabitants, estimated expectancy	3.5
Deaths registered, 1940	1,004
Deaths per 100,000 inhabitants, 1940	0.8
Cases reported for each death registered, 1940	9.787

ROCKY MOUNTAIN SPOTTED FEVER (39C)

27 States (furnishing complete reports of cases and deaths):[1]	
Cases reported, 1940 (population 74,895,000)	457
Cases per 100,000 inhabitants, 1940	0.6
Deaths registered, 1940	82
Deaths per 100,000 inhabitants, 1940	0.1
Cases reported for each death registered, 1940	5.573
47 States:[1]	
Deaths registered, 1940 (population 129,054,000)	82
Deaths per 100,000 inhabitants, 1940	0.1

SCARLET FEVER (8)

48 States:[1]	
Cases reported, 1940 (population 131,892,000)	155,464
Estimated expectancy based on years 1933–39	200,243
Cases per 100,000 inhabitants, 1940	117.9
Cases per 100,000 inhabitants, estimated expectancy	156.4
Deaths registered, 1940	652
Deaths per 100,000 inhabitants, 1940	0.5
Cases reported for each death registered, 1940	238

SEPTIC SORE THROAT (115B)

39 States (furnishing complete reports of cases and deaths):	
Cases reported, 1940 (population 90,849,000)	8,997
Cases per 100,000 inhabitants, 1940	9.9
Deaths registered, 1940	714
Deaths per 100,000 inhabitants, 1940	0.8
Cases reported for each death registered, 1940	12.601
46 States:[1]	
Deaths registered, 1940 (population 123,787,000)	1,135
Deaths per 100,000 inhabitants, 1940	0.9

SMALLPOX (34)

48 States:[1]	
Cases reported, 1940 (population 131,892,000)	2,795
Estimated expectancy based on years 1933–39	7,153
Cases per 100,000 inhabitants, 1940	2.1
Cases per 100,000 inhabitants, estimated expectancy	5.6
Deaths registered, 1940	15
Deaths per 100,000 inhabitants, 1940	0.01
Cases reported for each death registered, 1940	186

SYPHILIS (30)

48 States:[1]	
Cases reported, 1940 (population 131,892,000)	458,400
Cases per 100,000 inhabitants, 1940	347.6

TUBERCULOSIS (ALL FORMS) (13–22)

41 States (furnishing complete reports of cases and deaths):[1]	
Cases reported, 1940 (population 118,165,000)	99,267
Cases per 100,000 inhabitants, 1940	84.0
Deaths registered, 1940	53,462
Deaths per 100,000 inhabitants, 1940	45.2
Cases reported for each death registered, 1940	1.857
48 States:[1]	
Deaths registered, 1940 (population 131,892,000)	60,363
Deaths per 100,000 inhabitants, 1940	45.8

[1] The District of Columbia is also included but not counted as a State.

TUBERCULOSIS (RESPIRATORY SYSTEM) (13)

19 States (furnishing complete reports of cases and deaths):[1]	
Cases reported, 1940 (population 56,240,000)	47,472
Cases per 100,000 inhabitants, 1940	84.4
Deaths registered, 1940	24,305
Deaths per 100,000 inhabitants, 1940	43.2
Cases reported for each death registered, 1940	1.953
44 States[1]	
Deaths registered, 1940 (population 120,405,000)	51,066
Deaths per 100,000 inhabitants, 1940	42.4

TULAREMIA (26A)

40 States (furnishing complete reports of cases and deaths):[1]	
Cases reported, 1940 (population 121,487,000)	1,612
Cases per 100,000 inhabitants, 1940	1.3
Deaths registered, 1940	191
Deaths per 100,000 inhabitants, 1940	0.2
Cases reported for each death registered, 1940	8.440
47 States[1]	
Deaths registered, 1940 (population 129,054,000)	191
Deaths per 100,000 inhabitants, 1940	0.1

TYPHOID FEVER (1) AND PARATYPHOID FEVER (2)

48 States[1]	
Cases reported, 1940 (population 131,892,000)	9,809
Estimated expectancy based on years 1933–39	17,046
Cases per 100,000 inhabitants, 1940	7.4
Cases per 100,000 inhabitants, estimated expectancy	13.3
Deaths registered, 1940	1,439
Deaths per 100,000 inhabitants, 1940	1.1
Cases reported for each death registered, 1940	6.817

TYPHUS FEVER (39A, B)

20 States (furnishing complete reports of cases and deaths):	
Cases reported, 1940 (population 80,341,000)	1,589
Cases per 100,000 inhabitants, 1940	2.0
Deaths registered, 1940	97
Deaths per 100,000 inhabitants, 1940	0.1
Cases reported for each death registered, 1940	16.381
47 States[1]	
Deaths registered, 1940 (population 129,054,000)	101
Deaths per 100,000 inhabitants, 1940	0.1

UNDULANT FEVER (5)

47 States (furnishing complete reports of cases and deaths):[1]	
Cases reported, 1940 (population 129,054,000)	3,240
Cases per 100,000 inhabitants, 1940	2.5
Deaths registered, 1940	116
Deaths per 100,000 inhabitants, 1940	0.1
Cases reported for each death registered, 1940	27.931
48 States[1]	
Cases reported, 1940 (population 131,892,000)	3,310
Cases per 100,000 inhabitants, 1940	2.5

WHOOPING COUGH (9)

48 States.[1]	
Cases reported, 1940 (population 131,892,000)	183,866
Estimated expectancy based on years 1933–39	189,046
Cases per 100,000 inhabitants, 1940	139.4
Cases per 100,000 inhabitants, estimated expectancy	147.6
Deaths registered, 1940	2,875
Deaths per 100,000 inhabitants, 1940	2.2
Cases reported for each death registered, 1940	64

[1] The District of Columbia is also included but not counted as a State.

Cases reported, 1940, by months

Disease	Number of States[1]	January	February	March	April	May	June	July	August	September	October	November	December	Total
Anthrax in man (7)	14	6	3	8	5	8	5	6	9	4	7	7	11	[2] 79
Chickenpox (38e)	48	41 324	32, 213	32, 574	31, 745	30, 534	18, 463	7 174	2, 383	3, 386	13, 336	29, 390	37, 778	280 300
Dengue (38f)	6	3	4	5	4	3	7	3	9	4	9	16		[2] 67
Diphtheria (10)	48	1, 946	1, 510	1 381	1 025	917	785	629	815	1, 172	2, 031	1, 938	1, 387	15, 536
Dysentery (amebic) (27b)	40	159	223	218	179	273	371	463	345	293	214	244	156	[2] 3 143
Dysentery (bacillary) (27a)	38	437	479	621	635	989	3, 613	5, 090	3, 409	1, 954	1, 342	719	583	[2] 19 871
Dysentery (unspecified) (27c)	8	44	42	53	84	128	120	152	165	74	125	160	75	[2] 1 222
Encephalitis, epidemic or lethargic (37)	46	66	82	75	104	85	92	158	185	213	75	63	71	[2] 1 267
Influenza (33)	48	76, 358	88, 809	52, 750	14 684	6, 668	3 147	2 265	2 868	3, 634	5, 309	11, 540	163 506	[2] 431 538
Malaria (28)	41	1 388	1, 435	2, 593	3 596	5, 526	8, 583	12, 137	15, 927	13, 079	7, 683	4 021	2, 162	[2] 78, 130
Measles (35)	48	20 161	24, 503	37 413	44, 954	53, 138	37 653	16 425	4, 808	2, 888	7 376	15, 389	26, 454	291, 162
Meningitis, meningococcus (6)	48	151	189	190	161	152	117	114	121	109	108	113	140	[2] 1 665
Mumps (44c)	47	11, 843	12, 789	16, 972	16, 908	16, 293	8, 913	4 681	2, 825	2, 645	5, 374	8, 390	10 741	[2] 118, 374
Pellagra (69)	42	448	558	790	804	988	1 145	945	953	739	701	678	486	[2] 9 235
Pneumonia (all forms) (107–109)	48	21, 603	24, 991	21, 801	16, 501	13, 230	7 699	5 524	4 977	5, 466	7 379	11, 122	16 924	[2,3,4] 157 512
Poliomyelitis (36)	48	162	106	79	70	142	229	545	2, 086	3, 174	2, 098	853	260	[3] 9 826
Rabies in animals	25	213	237	254	291	267	242	202	146	144	167	207	184	2, 554
Rabies in man (deaths) (38b)	47	1	4		4	8	5	2	5		3	1	4	37
Rocky Mountain spotted fever (39c)	27	2	1	8	34	80	98	91	101	28	8	3	3	457
Scarlet fever (8)	48	19, 186	19, 933	22, 363	22 044	19 575	8, 960	4, 258	2, 735	4, 431	8, 620	11, 070	12, 289	155, 404
Septic sore throat (115b)	47	1, 308	1, 246	1, 273	1 275	1 059	737	530	673	427	549	686	821	[2] 10 584
Smallpox (34)	48	384	325	341	312	280	264	151	75	41	87	157	369	2 735
Tuberculosis (all forms) (13–22)	48	7 627	7, 645	9 496	8, 775	9 970	9 776	9 243	9 758	8, 573	8 988	8, 017	8, 300	[2,5] 106 168
Tuberculosis (respiratory system) (13)	45	6 410	6, 074	7 013	6, 724	7, 282	6, 797	6, 596	7, 206	6, 315	6, 840	5, 819	6, 242	[2] 79 318
Tularemia (26a)	41	356	77	101	53	77	86	105	110	62	48	155	386	[3] 1 620
Typhoid and paratyphoid fever (1–2)	48	354	289	388	393	613	769	1, 354	1, 891	1, 595	1, 042	654	467	9 809
Typhus fever (39a, b)	25	123	99	79	64	84	104	207	232	256	253	221	160	[2] 1 882
Undulant fever (5)	48	212	203	238	211	298	412	340	339	290	314	225	228	3 310
Venereal diseases														
Gonorrhea (25)	47	13 718	12 858	13, 673	13 755	14 191	14 190	15, 787	17 035	16, 735	18, 004	15 238	14, 805	179 989
Syphilis (30)	48	32, 495	37 096	43 371	43, 007	42, 090	37 387	38, 955	40 708	36 389	38, 239	33, 613	35, 050	458 400
Whooping cough (9)	48	13, 362	13, 336	14 653	15 675	17, 302	15, 987	16 229	14, 089	11, 934	16, 056	18, 038	17, 205	183 866

[1] The District of Columbia is also included but not counted as a State

[2] Includes the number of deaths used as cases in those States which reported no cases or in those States where the reported number of cases is less than the number of deaths

[3] The following numbers of cases of certain diseases are not distributed by months, but are included in the totals of the above table Pneumonia (all forms), 295, poliomyelitis, 22; tularemia, 4

[4] Includes 4 332 cases of lobar pneumonia only in Massachusetts and 3 145 cases of lobar pneumonia only in California

[5] The numbers of cases of tuberculosis (respiratory system) only are included as follows Iowa, 533 Virginia, 2,166, Louisiana, 1,907.

Note —Figures in parentheses are disease title numbers from the International List of Causes of Death, 1938.

Deaths registered, 1940, by months

Disease	Number of States[1]	January	February	March	April	May	June	July	August	September	October	November	December	Total
Anthrax in man (7)	48	4	1	1		1	1		1		2			11
Chickenpox (38c)	47	14	17	9	8	9	3	3	1	1	2	9	12	88
Dengue (38f)	46					1		1						2
Diphtheria (10)	48	249	154	95	81	66	56	61	62	117	185	171	170	1,467
Dysentery (amebic) (27b)	43	16	14	17	15	16	21	38	33	33	21	18	15	257
Dysentery (bacillary) (27a)	43	21	18	19	27	48	103	220	184	104	77	55	25	901
Dysentery (unspecified) (27c)	45	5		3	3	3	1	5	9	6	8	6	1	[2] 480
Encephalitis, epidemic or lethargic (37)	48	56	72	67	79	63	60	83	81	70	52	54	52	789
Influenza (33)	48	3,877	4,770	3,270	1,911	1,060	524	365	315	356	516	825	2,539	20,328
Malaria (28)	48	36	28	46	53	78	114	216	255	244	183	97	43	1,393
Measles (35)	48	69	72	110	114	100	73	55	28	7	14	10	29	681
Meningitis, meningococcus (6)	48	77	69	58	55	58	53	41	39	27	54	42	55	628
Mumps (44c)	45	12	12	16	9	9	10	6	12	5	4	3	6	104
Pellagra (69)	47	190	178	177	157	177	166	161	174	169	174	168	149	2,040
Pneumonia (all forms) (107–109)	48	10,616	10,290	8,576	6,595	5,180	3,623	3,271	2,889	3,214	4,296	5,639	8,050	72,239
Poliomyelitis (36)	48	36	31	29	17	23	29	76	194	222	167	109	71	1,004
Rabies in man (38b)	47	1	4		4	8	5	2	5		3	1	4	37
Rocky Mountain spotted fever (39c)	47			1	10	19	19	14	14	4	1			82
Scarlet fever (8)	48	103	91	81	70	53	39	24	19	40	39	44	49	652
Septic sore throat (115b)	46	109	97	109	106	95	94	92	90	82	80	96	85	1,135
Smallpox (34)	48	2	2	2	2	2		3	1		1			15
Tuberculosis (all forms) (13–22)	48	5,194	5,233	5,653	5,446	5,435	5,105	5,062	4,837	4,544	4,547	4,599	4,708	[3] 60,363
Tuberculosis (respiratory system) (13)	44	4,394	4,450	4,792	4,617	4,563	4,290	4,254	4,094	3,870	3,846	3,884	4,012	[3] 51,066
Tularemia (26a)	47	30	10	7	7	12	12	14	12	11	4	21	51	191
Typhoid and paratyphoid fever (1–2)	48	61	56	68	63	84	113	212	210	237	141	117	77	1,439
Typhus fever (39a, b)	47	4	7	2	5	5	10	16	12	10	17	7	6	101
Undulant fever (5)	47	15	10	13	11	9	15	13	3	9	4	8	6	116
Whooping cough (9)	48	197	211	239	250	219	249	289	247	213	235	248	278	2,875

[1] The District of Columbia is also included but not counted as a State.
[2] Includes 430 deaths from dysentery (unspecified) not reported by months
[3] Includes the numbers of deaths at Glenn Dale Sanatorium.

NOTE.—Figures in parentheses are disease title numbers from the International List of Causes of Death, 1938

DEATHS DURING WEEK ENDED JANUARY 31, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Jan. 31, 1942	Corresponding week, 1941
Data from 87 large cities of the United States.		
Total deaths	8,837	10,007
Average for 3 prior years	9,808	
Total deaths, 4 weeks	37,334	39,670
Deaths per 1,000 population, 4 weeks, annual rate	13 2	14.0
Deaths under 1 year of age	539	555
Average for 3 prior years	557	
Deaths under 1 year of age, 4 weeks	2,268	2,211
Data from industrial insurance companies.		
Policies in force	64,892,393	64,727,301
Number of death claims	13,017	14,899
Death claims per 1,000 policies in force, annual rate	10 5	12 0
Death claims per 1,000 policies, 4 weeks, annual rate	10 4	11 2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED FEBRUARY 7, 1942

Summary

No unusual incidence of the important communicable diseases was reported during the current week, although measles, poliomyelitis, and whooping cough were slightly above the 5-year (1937–41) median expectancy. The number of reported cases of measles increased from 10,489 to 14,351, poliomyelitis from 24 to 30, and influenza from 4,899 to 5,667, as compared with the preceding week.

The highest incidence of influenza continues in the South Atlantic and South Central States, which reported about 83 percent of the total cases for the current week. Texas reported the largest number (1,693), South Carolina 871, Alabama 700, Arkansas 426, and Virginia 369 No other State reported more than 300 cases. The incidence is low in the New England, Middle Atlantic, and North Central areas.

The current incidence of meningococcus meningitis (60 cases) is below the 5-year median (65 cases), but the cumulative total (5 weeks ended February 7) of 290 cases is slightly above the 5-year cumulative median (275 cases). The current cases were distributed in 26 States (New York 9, Pennsylvania 5, and Maryland 5; no other State reported more than 4 cases).

Other reports include 28 cases of amebic dysentery (6 in Texas, 4 in Tennessee), 69 cases of bacillary dysentery (37 in Oklahoma), 50 cases of unspecified dysentery (36 in Virginia, 13 in Arizona), 44 cases of endemic typhus fever, 18 cases of tularemia, and 2 cases of anthrax (in New Jersey and Louisiana). A total of 30 cases of poliomyelitis was reported, as compared with 24 last week and a 5-year median of 21 cases. The current cases were widely distributed.

The crude death rate for the current week for 88 large cities in the United States is 12.4 per 1,000 population, as compared with 12.5 for the preceding week and a 3-year (1939–41) average of 13.9.

Telegraphic morbidity reports from State health officers for the week ended February 7, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report while leaders imply that although none were reported, cases may have occurred

Division and State	Diphtheria, Week ended— Feb 7 1942	Diphtheria, Week ended— Feb 8 1941	Diphtheria, Median 1937-41	Influenza, Week ended— Feb 7, 1942	Influenza, Week ended— Feb 8 1941	Influenza, Median 1937-41	Measles, Week ended— Feb 7 1942	Measles, Week ended— Feb 8 1941	Measles, Median 1937-41	Meningitis meningococcus, Week ended— Feb 7 1942	Meningitis meningococcus, Week ended— Feb 8 1941	Meningitis meningococcus, Median 1937-41
NEW ENG												
Maine	0	0	1	2	63	4	269	70	70	0	0	0
New Hampshire	0	0	0		5	2	0	8	52	0	0	0
Vermont	0	0	0		26		3	10	10	0	0	0
Massachusetts	4	1	3				462	432	432	4	1	1
Rhode Island	3	0	0	1	10		100	0	[illegible]	0	0	0
Connecticut	3	0	1		317	12	170	30	177	1	0	0
MID ATL												
New York	16	11	26	10	1 427	1 119	55	3 086	706	9	4	7
New Jersey	5	15	15	23	1 156	56	165	844	708	3	2	2
Pennsylvania	11	25	50				1 553	2 919	222	5	2	7
E NO CEN												
Ohio	17	10	21	14	863	22	180	1 836	66	2	3	2
Indiana	10	11	18	40	173	90	78	183	12	0	0	1
Illinois	17	19	46	20	195	134	171	1 831	37	1	1	3
Michigan [2]	1	2	9	21	155	10	110	1 320	420	1	0	0
Wisconsin	0	0	1	35	715	77	241	585	585	1	1	0
W NO CEN												
Minnesota	3	8	9	2	698	4	461	5	29	0	2	0
Iowa	4	13	4	7	396	25	103	130	97	0	0	1
Missouri	4	4	10	8	68	68	189	74	16	1	1	1
North Dakota	[illegible]	0	1	35	84	61	190	11	13	0	0	2
South Dakota	2	1	1		22	4	0	18	7	0	0	1
Nebraska	0	1	2		14	2	25	6	6	2	0	0
Kansas	4	4	5	14	340	101	278	174	174	0	3	1
SO ATL												
Delaware	0	1	0		10		24	50	33	0	0	0
Maryland [2]	13	5	7	40	351	203	340	61	61	5	0	0
Dist of Col	1	0	3	1	79	[illegible]	18	14	14	1	0	0
Virginia	14	6	19	369	5 976	1 100	140	498	183	3	1	2
West Virginia	8	7	11	27	1 185	460	584	134	20	3	0	4
North Carolina	12	16	36	80	599	[illegible]	1 003	182	182	1	0	1
South Carolina	14	7	5	871	3 060	968	205	47	40	0	2	2
Georgia	7	7	7	117	1 509	728	406	202	97	0	2	2
Florida	5	4	11	14	387	44	114	21	41	0	0	0
E SO CEN												
Kentucky	7	11	8	10	246	198	47	203	63	1	3	8
Tennessee	6	10	10	127	2 003	424	112	99	54	1	3	3
Alabama	14	5	12	700	3 561	536	94	476	90	1	5	5
Mississippi [2]	3	2	5							4	3	2
W SO CEN												
Arkansas	[3] 10	12	9	[3] 426	767	767	[3] 289	83	83	8	0	1
Louisiana	14	5	11	24	218	218	47	7	7	2	2	0
Oklahoma	5	15	10	231	657	657	252	11	11	0	0	1
Texas	42	22	54	1 693	2 545	2 545	1 909	518	270	2	2	3
MOUNTAIN												
Montana	7	10	1	31	116	25	168	8	19	0	0	0
Idaho	0	2	1			6	6	25	28	0	0	0
Wyoming	0	0	0	119	189	4	39	14	6	1	0	0
Colorado	6	9	9	85	811	26	223	85	54	0	0	0
New Mexico	2	2	2	8	9	9	82	72	31	0	0	0
Arizona	5	2	2	232	281	281	220	80	13	1	0	0
Utah [2]	0	2	2	6	66	20	28	15	39	0	0	0
Nevada	0	0		1			7	0		0	0	
PACIFIC												
Washington	1	0	3	11	52	85	70	70	70	0	0	0
Oregon	1	8	2	28	54	59	120	326	85	0	0	1
California	17	18	32	175	1 887	887	2 501	101	811	1	3	2
Total	823	308	538	5 667	31 845	16 583	14 351	16 973	11 583	60	46	65
5 weeks	1 804	1 537	3 027	22 592	387 322	72 550	50 679	63 701	48 238	290	246	275

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended February 7, 1942, and comparison with corresponding week of 1941 and 5-year median—Continued

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Feb 7, 1942	Feb 8, 1941		Feb 7, 1942	Feb 8, 1941		Feb 7 1942	Feb 8, 1941		Feb 7 1942	Feb 8 1941	
NEW ENG												
Maine	0	0	0	15	9	19	0	0	0	0	0	0
New Hampshire	0	0	0	6	4	4	0	0	0	0	0	0
Vermont	0	0	0	6	4	9	0	0	0	0	0	0
Massachusetts	1	0	0	337	113	205	0	0	0	5	1	1
Rhode Island	0	0	0	13	10	12	0	0	0	0	0	0
Connecticut	1	0	0	54	43	93	0	0	0	2	1	1
MID ATL.												
New York	1	0	1	445	380	661	0	0	0	6	5	6
New Jersey	2	0	0	130	309	175	0	0	0	0	0	1
Pennsylvania	2	1	0	298	248	475	0	0	0	4	0	8
E NO CEN												
Ohio	0	0	0	376	296	316	0	5	5	2	1	1
Indiana	1	0	0	116	145	211	0	0	6	0	4	1
Illinois	2	2	1	260	454	583	2	0	5	2	3	3
Michigan [2]	1	1	1	224	142	474	0	8	4	6	0	1
Wisconsin	0	3	1	180	165	185	0	12	8	3	0	0
W NO CEN												
Minnesota	0	1	0	97	49	186	0	6	6	1	0	0
Iowa	0	2	0	63	46	180	1	3	33	1	0	0
Missouri	1	5	0	131	76	115	0	3	12	1	0	1
North Dakota	1	0	0	30	16	28	0	0	1	0	0	0
South Dakota	0	0	0	54	17	29	0	0	11	0	1	0
Nebraska	0	0	0	34	25	42	1	0	3	0	0	0
Kansas	0	0	0	90	72	192	0	0	10	0	0	0
SO ATL												
Delaware	0	0	0	56	7	6	0	0	0	0	0	0
Maryland [2]	0	1	0	90	82	56	0	0	0	0	2	2
Dist of Col	0	0	0	11	9	19	0	0		1	1	1
Virginia	0	0	0	48	47	40	0	0	[illegible]	3	4	4
West Virginia	0	0	1	60	30	46	0	0	0	0	0	0
North Carolina	1	3	0	68	48	48	0	0	0	0	2	3
South Carolina	2	0	0	9	6	7	1	0	0	0	0	2
Georgia	1	0	1	17	21	21	1	0	0	25	0	2
Florida	0	2	0	11	2	11	0	0	0	3	0	2
E SO CEN												
Kentucky	0	0	1	84	83	83	4	0	0	0	4	2
Tennessee	4	0	0	84	102	40	0	0	1	3	2	1
Alabama	0	0	0	11	14	14	2	0	0	1	1	4
Mississippi [2]	0	1	2	7	5	5	2	1	1	3	0	1
W SO CEN.												
Arkansas	1	1	0	[3] 10	9	9	0	2	2	2	2	2
Louisiana	0	0	0	6	4	13	0	2	0	3	3	6
Oklahoma	0	1	1	25	18	34	1	1	1	1	0	2
Texas	3	0	0	49	30	102	2	0	7	3	8	8
MOUNTAIN												
Montana	0	0	0	38	25	35	0	1	2	1	1	0
Idaho	0	0	0	4	16	16	0	1	8	2	0	0
Wyoming	2	0	0	20	8	8	0	0	0	0	0	0
Colorado	0	0	0	37	37	46	0	6	6	1	0	0
New Mexico	0	1	0	5	4	9	0	0	0	0	3	3
Arizona	1	0	0	9	7	13	0	2	1	0	1	1
Utah [2]	0	1	0	39	7	31	0	0	0	0	0	0
Nevada	0	0	------	4	0	------	0	0	------	0	0	----
PACIFIC												
Washington	0	0	0	25	24	59	0	0	3	0	0	1
Oregon	0	0	0	6	18	45	0	0	5	0	1	0
California	1	2	2	133	105	220	0	0	8	0	5	5
Total	29	26	21	8,925	8,421	5,601	17	53	813	85	56	96
5 weeks	138	149	121	18,045	16,773	26,182	84	264	1,457	400	371	554

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended February 7, 1942—Continued

Division and State	Whooping cough, Week ended— Feb. 7, 1942	Whooping cough, Week ended— Feb. 8, 1941	Week ended February 7, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	22	8	0	0	0	0	1	0	0	0	0
New Hampshire	4	2	0	0	0	0	0	0	0	0	0
Vermont	29	8	0	0	0	0	0	0	0	0	0
Massachusetts	236	272	0	0	2	0	0	0	0	0	0
Rhode Island	74	6	0	0	0	0	0	0	0	0	0
Connecticut	122	52	0	0	1	0	0	0	0	0	0
MID. ATL.											
New York	594	337	0	2	10	0	2	0	0	0	1
New Jersey	232	102	1	0	0	0	0	0	0	0	0
Pennsylvania	243	435	0	0	1	0	3	0	0	0	0
E. NO. CEN.											
Ohio	268	341	0	1	0	0	0	1	0	0	0
Indiana	39	9	0	0	0	0	0	0	0	0	0
Illinois	183	107	0	2	10	0	0	0	0	2	0
Michigan [2]	291	175	0	0	0	0	0	0	0	0	0
Wisconsin	327	150	0	0	0	0	0	0	0	1	0
W. NO. CEN.											
Minnesota	56	58	0	0	0	0	0	0	0	0	0
Iowa	42	29	0	0	0	0	0	0	0	1	0
Missouri	38	53	0	0	0	1	0	0	0	3	0
North Dakota	8	18	0	0	0	0	0	0	0	0	0
South Dakota	8	8	0	0	0	0	0	0	0	0	0
Nebraska	1	15	0	0	0	0	0	0	0	0	0
Kansas	41	70	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	2	8	0	0	0	0	0	0	0	0	0
Maryland [2]	61	94	0	0	0	0	0	0	0	1	0
District of Columbia	11	5	0	0	0	0	0	0	0	0	0
Virginia	65	232	0	0	0	36	0	0	0	1	2
West Virginia	55	43	0	0	0	0	0	0	0	0	0
North Carolina	224	302	0	0	0	0	0	0	0	0	0
South Carolina	71	61	0	0	0	0	0	0	0	0	0
Georgia	83	15	0	1	0	0	0	0	0	1	19
Florida	39	17	0	0	0	0	0	0	0	0	5
E. SO. CEN.											
Kentucky	122	38	0	0	1	0	0	0	0	1	0
Tennessee	41	73	0	4	2	0	0	0	0	1	1
Alabama	9	40	0	0	0	0	0	0	0	2	6
Mississippi [2]			0	0	0	0	0	0	-	0	1
W. SO. CEN.											
Arkansas [3]	11	25	0	1	0	0	0	0	0	3	0
Louisiana	0	1	1	0	1	0	0	0	0	0	3
Oklahoma	8	31	0	0	0	0	0	0	0	0	0
Texas	119	387	0	6	37	0	0	0	0	1	4
MOUNTAIN											
Montana	25	7	0	0	0	0	0	0	0	0	0
Idaho	9	14	0	0	0	0	0	0	0	0	0
Wyoming	1	9	0	0	0	0	0	0	0	0	0
Colorado	24	59	0	0	0	0	0	0	0	0	0
New Mexico	29	13	0	0	0	0	0	0	0	0	0
Arizona	72	5	0	0	0	13	0	0	0	0	0
Utah [2]	15	74	0	0	0	0	0	0	0	0	0
Nevada	7	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	114	123	0	0	0	0	0	0	0	0	0
Oregon	34	13	0	0	0	0	0	0	0	0	0
California	265	424	0	11	4	0	0	0	0	0	2
Total	4,327	4,377	2	28	69	50	6	1	2	18	44
5 weeks	21,701	22,264									

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Figures for Arkansas include delayed reports as follows: Diphtheria, 1; influenza, 49; measles, 20; scarlet fever, 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended January 24, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	8	2	0	0	4	0	10	0	0	0
Baltimore, Md	4	0	2	2	207	1	20	0	20	0	2	25
Billings, Mont	0	0		0	0	0	1	0	0	0	0	0
Birmingham, Ala	4	0	14	2	1	0	7	0	5	0	1	3
Boise, Idaho	0	0		0	0	0	0	0	0	0	0	0
Boston, Mass	0	0		0	50	0	15	0	99	0	2	47
Bridgeport, Conn	0	0	1	1	4	0	3	0	2	0	0	1
Brunswick, Ga	1	0		0	1	0	0	0	0	0	0	0
Buffalo, N. Y	0	0		0	5	0	7	0	13	0	0	16
Camden, N. J	1	0		0	6	0	1	0	7	0	0	2
Charleston, S. C	0	0	70	2	1	0	0	0	3	0	1	0
Charleston, W. Va	1	0		0	2	0	4	0	1	0	0	0
Chicago, Ill	15	0	4	2	23	0	30	1	128	0	0	118
Cincinnati, Ohio	2	0		0	2	0	4	0	21	0	0	11
Cleveland, Ohio	0	0	21	0	13	3	22	0	49	0	1	39
Columbus, Ohio	0	0	1	1	8	0	4	0	4	0	0	6
Concord, N. H	0	0		0	0	0	1	0	1	0	0	0
Cumberland, Md	0	0		0	3	0	0	0	0	0	0	0
Dallas, Tex	3	0	1	1	71	0	2	0	10	0	0	2
Denver, Colo	4	0	46	0	63	0	5	0	6	0	0	15
Detroit, Mich	2	0	1	1	51	0	17	0	117	0	0	64
Duluth, Minn	0	0		0	3	0	0	0	5	0	0	2
Fall River, Mass	2	0		0	2	0	0	0	42	0	0	0
Fargo, N. Dak	0	0		0	0	0	0	0	0	0	0	1
Flint, Mich	0	0		0	1	0	3	0	3	0	0	4
Fort Wayne, Ind	0	0		0	0	0	1	0	0	0	0	2
Frederick, Md	0	0		0	1	0	1	0	1	0	0	0
Galveston, Tex	0	0		0	0	0	1	0	2	0	1	0
Grand Rapids, Mich	0	0		0	5	0	0	0	2	0	0	6
Great Falls, Mont	0	0		0	60	0	0	0	1	0	0	5
Hartford, Conn	0	0		0	3	0	0	0	5	0	0	10
Helena, Mont	0	0		0	1	0	0	0	1	0	0	4
Houston, Tex	9	0		0	8	0	9	0	9	0	1	0
Indianapolis, Ind	1	0		1	11	0	12	0	23	0	0	30
Kansas City, Mo	1	0		3	6	0	6	0	20	0	0	2
Kenosha, Wis	0	0		0	5	0	1	0	4	0	0	0
Little Rock, Ark	0	0	7	0	10	0	4	0	0	0	0	0
Los Angeles, Calif	6	0	25	1	70	5	18	0	21	0	0	17
Lynchburg, Va	0	0		0	0	0	0	0	0	0	1	2
Memphis, Tenn	0	0	20	2	1	0	6	0	2	0	1	11
Milwaukee, Wis	0	0		0	17	0	0	0	85	0	0	112
Minneapolis, Minn	0	0		1	23	0	2	0	28	0	0	4
Missoula, Mont	0	0		0	0	0	3	0	1	0	0	0
Mobile, Ala	3	0		1	8	0	2	0	1	0	0	0
Nashville, Tenn	0	0		0	1	0	4	0	3	0	0	3
Newark, N. J	0	0	5	0	36	0	8	2	19	0	0	34
New Haven, Conn	0	0		0	79	0	4	0	3	0	0	14
New Orleans, La	0	0	3	3	9	0	7	0	2	0	2	0
New York, N. Y	18	1	11	1	32	3	69	1	167	0	3	260
Omaha, Nebr	0	0		0	7	0	7	0	6	0	0	0
Philadelphia, Pa	0	0	4	1	16	1	23	0	110	0	1	75
Pittsburgh, Pa	1	0	3	1	11	0	12	0	18	0	0	23
Portland, Maine	0	0		0	4	0	1	0	4	0	0	5
Providence, R. I	1	0	1	0	30	0	5	0	10	0	0	51
Pueblo, Colo	0	0		0	67	0	1	0	4	0	0	2
Racine, Wis	0	0		0	14	0	0	0	4	0	0	21
Raleigh, N. C	0	0		0	1	0	1	0	4	0	0	9
Reading, Pa	0	0		1	4	0	2	0	0	0	0	1
Richmond, Va	0	0		0	8	1	6	0	8	0	0	0

City reports for week ended January 24, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Roanoke Va	0	0		0	0	0	0	0	0	0	0	0
Rochester N Y	0	0		0	2	0	1	0	1	0	0	21
Sacramento Calif	1	0		0	147	0	1	0	4	0	0	18
St Joseph Mo	0	0		0	2	0	4	0	3	0	0	0
St Louis Mo	0	0	7	1	23	0	18	0	10	0	0	8
St Paul Minn	0	0	--	0	160	0	4	0	8	0	0	8
Salt Lake City Utah	0	0		0	4	0	1	0	4	0	0	3
San Antonio Tex	0	0		1	2	0	10	0	2	0	0	0
San Francisco Calif	0	0	4	1	40	0	7	0	13	0	0	5
Savannah Ga	0	0	18	3	37	0	4	0	0	0	0	1
Seattle Wash	0	0		1	1	0	7	0	2	0	0	24
Shreveport La	1	0		0	1	1	2	0	3	0	0	0
South Bend Ind	0	0		0	2	0	0	0	9	0	0	1
Spokane Wash	0	0	2	2	1	0	2	0	5	0	0	4
Springfield Ill	0	0		0	2	0	2	0	5	0	0	0
Springfield Mass	0	0		0	14	0	5	0	17	0	0	46
Superior Wis	0	0		0	2	0	0	0	1	0	0	4
Syracuse N Y	0	0		0	1	1	3	0	6	0	0	55
Tacoma Wash	0	0		2	0	0	0	0	2	0	0	2
Tampa Fla	1	0	1	1	1	1	1	0	0	0	0	1
Terre Haute Ind	0	0		0	0	0	1	0	0	0	0	0
Topeka Kans	0	0		0	1	0	1	0	4	0	0	10
Trenton N J	0	1		0	1	0	2	0	5	0	0	7
Washington D C	3	0	3	1	17	1	12	0	15	0	0	26
Wheeling W Va	0	0		0	43	0	2	0	1	0	0	0
Wichita Kans	0	0		0	13	0	7	0	3	0	0	2
Wilmington Del	1	0		0	0		2	0	16	0	0	0
Wilmington N C	1	0		0	139	0	1	0	0	0	0	5
Winston Salem N C	0	0	7	1	72	0	2	0	2	0	0	1
Worcester Mass	0	0		0	7	0	3	0	14	0	0	49

Tularemia—Cases Birmingham 1 Memphis 1
Dysentery amebic Cases Chicago 1 Dallas 2 Detroit 1 Los Angeles 4 New York 2
Dysentery bacillary Cases Detroit 1 Los Angeles 1 New Haven 1 New York 3 Rochester, 1
Typhus fever Cases Charleston S C 2 Mobile 1 New Orleans 3

Rates (annual basis) per 100,000 population for a group of 89 selected cities (population, 1942, 33,763 643)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Jan 24 1942	13 31	44 83	6 43	273 86	71 30	186 50	0 00	2 45	207 31
Average for week 1937-41	21 47	428 71	23 63	464 08	135 59	220 07	5 10	2 93	179 30

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended January 10, 1942.—During the week ended January 10, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		4		7	11	2		2	1	27
Chickenpox		16	3	275	496	91	69	39	172	1,161
Diphtheria		32	1	29		2	1		3	68
Dysentery				3						3
German measles	2	3		38	21	2	10	2	12	90
Influenza		16				5			113	134
Measles		2	2	533	109	89	37	3	25	800
Mumps		11		523	251	91	137	60	261	1,334
Pneumonia		2			11	3			4	20
Poliomyelitis		1						2		3
Scarlet fever	2	23	5	88	231	20	39	62	30	506
Tuberculosis	1	9	9	57	37			4		117
Typhoid and paratyphoid fever				18	3	1				22
Undulant fever				1	1				1	3
Whooping cough		12	3	175	79	1			13	283
Other communicable diseases		3		14	207		2	1	12	239

CUBA

Habana—Communicable diseases—4 weeks ended January 10, 1942.—During the 4 weeks ended January 10, 1942, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	25	1	Scarlet fever	2	
Malaria	36		Tuberculosis	4	1
Measles	7		Typhoid fever	29	3
Poliomyelitis	1				

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

Cholera

India—Bombay—Correction.—On page 2477 of the PUBLIC HEALTH REPORTS of December 26, 1941, 115 cases of cholera were reported in Bombay, India. This is an error and should read 15 cases.

Plague

Argentina.—Plague has been reported in Argentina as follows: July 1–31, 1941, Cordoba Province, 9 cases; Mendoza Province, 3 cases. August 1–31, Cordoba Province, 7 cases. September 1–30, Cordoba Province, 1 case. October 1–31, Cordoba Province, 3 cases; Santiago del Estero Province, 2 cases. November 1–30, Cordoba Province, 2 cases. December 1–31, Cordoba Province, 7 cases.

Chile—Valparaiso.—During the week ended February 7, 1942, one case of bubonic plague was reported in Valparaiso, Chile, the last previous case being reported in October 1941.

Typhus Fever

Colombia.—During the month of September 1941, 5 cases of typhus fever were reported in Cundinamarca Department and 2 cases of typhus fever with 2 deaths were reported in Magdalena Department, Colombia.

Yellow Fever

Sierra Leone—Freetown.—A fatal case of yellow fever in a European, occurring during January 1942, has been reported in Freetown, Sierra Leone, Africa. The diagnosis was made from necropsy material sent to London. This is believed to be the first case of yellow fever reported in a European in this district since 1935. A suspected case was reported in Kailahun, Sierra Leone, during May 1938.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E R COFFEY, *Assistant Surgeon General, Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable and of cholera plague smallpox typhus fever, yellow fever, and other important communicable diseases throughout the world, (2) articles relating to the cause, prevention, and control of disease (3) other pertinent information regarding sanitation and the conservation of the public health

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DIPHTHERIA TOXOID TREATMENT OF LEPROSY

A PRELIMINARY REPORT

By G. H. FAGET, *Surgeon*, and F. A. JOHANSEN, *Surgeon* (R), *United States Public Health Service*

In view of the early favorable reports of Collier (*1*) on the treatment of leprosy with diphtheria toxoid, it was decided to try this treatment on some of the patients at the United States Marine Hospital in Carville, La. Since one of the outstanding claims made for this new therapy was the abolition of leprotic reactions, it was thought best to start with a group of patients who had been having frequent acute leprotic reactions with evanescent tubercles and fever. Twelve such patients were selected and were started on the diphtheria toxoid treatment during the period from October 1940 to February 1941. The technique used was that advocated by Collier (*2*). This first group of patients was classified as follows: L_1 2 cases, L_2 4 cases, L_2N_1 1 case, L_3 3 cases, and L_3N_3 2 cases (*3*).

Of this group, 5 patients were given doses of 1 cc. of diphtheria toxoid prior to February 1941 and have continued the course of monthly injections to the date of this report. They have therefore received the largest amount of toxoid over the longest period of time.

One of these patients, M. L. (L_1), gives a history of having had periodic leprous reactions, consisting of fever and outcropping of evanescent tubercles, which would clear up and in a few weeks recur. She was given the first injection of 1 cc. of diphtheria toxoid on October 25, 1940. This dose was repeated on November 1, November 5, November 19, and December 3. Then, after a short rest, she began taking it again in February 1941 in doses of 1 to 3 cc., with the group of patients starting the toxoid treatment at that time. During the course of treatment this patient's reactions would clear up for a while and then would recur. Some of the later reactions were more severe than those she experienced before starting the diphtheria toxoid. These reactions have continued unabated. She has received to date a total of 24 cc. of toxoid. Leprous lesions, as well as leprous reactions, have become progressively worse.

Another patient, L. S. C. (L_3), had been having severe leprous reactions with the disease progressing unfavorably. On November 5, November 19, and De-

cember 3, 1940, she was given 1 cc. of diphtheria toxoid. Then, in February 1941, she continued the treatment with the other patients. There has been a continuation of the leprous reactions in this case with the disease slowly becoming worse. No lessening in the severity of the reactions was noted. This patient has received a total of 23 cc. of toxoid.

J. C. (L_2) had been having more or less continuous outcropping of evanescent tubercles for a year. On December 17 and December 24, 1940, he was given 1 cc. of diphtheria toxoid, and in February 1941 continued the treatment with the group of patients started at that time. After the first injection of toxoid, he had a severe reaction followed by a larger number of tubercles than before. He has continued to have periodic attacks of tubercles but says that recently they have not been so severe as previously. In all, he has received a total of 22 cc. of toxoid.

J. S. (L_1) gives a history of having had tubercles for 3 weeks prior to January 13, 1941, on which date 1 cc. of diphtheria toxoid was given. This dose was repeated on January 20 and 27 and monthly thereafter in doses up to 3 cc. starting in February. He has been given a total of 23 cc. of toxoid. For the past 4 months he has been free of tubercles.

A. W. (L_3N_3) had been having many attacks of leprous reactions with tubercles and the disease was progressing unfavorably. She was started on 1 cc. injections of diphtheria toxoid on December 3, 1940. This dose was repeated on December 11 and 16, and thereafter she continued treatment with the group of patients started in February 1941. There has been no lessening in the leprous reactions, and the disease continues to progress. She has received a total of 23 cc. of diphtheria toxoid.

In addition to the above cases, 7 patients who had not had any recent leprous reactions started treatment in February 1941. Six of these have continued the treatment to the date of this report and have received a total of 20 cc. of diphtheria toxoid. The seventh patient discontinued the treatment voluntarily after the ninth month because he felt that it was injurious to him. Examination of the patient at that time showed clinical evidence that the disease had been aggravated. Two of this last group of patients have experienced severe leprous reactions with tubercle formation since commencing the special treatment.

Of the 11 patients who have persisted in the diphtheria toxoid therapy to the present date, examination shows that 1 (L_1) is slightly improved, 3 are in a stationary state, and 8 are in a worse condition than at the start of the experiment.

In March 1941 it was decided to carry on a more extensive and carefully controlled study of diphtheria toxoid therapy. Seventy-one patients volunteered for this experiment. Before starting treatment all patients were thoroughly examined and classified. Photographs were taken of their more prominent lesions and charts were made of anesthetic areas. On the basis of these findings the patients were divided into two groups as nearly similar as possible. To one group of 36 patients diphtheria toxoid therapy was administered according to the technique recommended by Collier. To the other group of 35 patients, used as controls, like dosages of the broth from which the diphtheria toxoid is produced were administered.

After 10 months of treatment, during which 18 cc. of diphtheria toxoid or broth were given to each patient, a complete reexamination was performed on every patient and new neurological charts were made. New photographs duplicating previous exposures were made of lesions wherever there was any indication of changes either for better or for worse. Tables 1 and 2 show the results of these examinations. Since one of the toxoid-treated patients absconded before reexamination, an equal number of patients appears in each group.

TABLE 1

Classification	Group given toxoid							Control group						
	Great improvement	Moderate improvement	Slight improvement	Unchanged	Slightly worse	Moderately worse	Much worse	Great improvement	Moderate improvement	Slight improvement	Unchanged	Slightly worse	Moderately worse	Much worse
N_1					1						1			
N_2				1	1	1					1			
N_3						1					1			
Nt		1	1							2	1			
L_1			1	1			1		1	3				
L_1N_2											1			
L_2	1	1	2	3	6	1			1	3	7	3		
L_2N_2				2	1						1			
L_3			1	1	2	1			1		1	3		
L_3N_2				1							2		2	
L_3N_3				1	1									
Total	1	2	5	10	12	4	1		3	8	16	6	2	

TABLE 2

	Group given toxoid			Control group		
	Improved	Stationary	Worse	Improved	Stationary	Worse
Neural cases	0	1	4	0	3	0
Tuberculoid	2	0	0	2	1	0
Lepromata	6	9	13	9	12	8
Total	8	10	17	11	16	8

From these tables it can be seen that the results in the control group were better than those in the group given toxoid.

On two occasions Dr. G. W. McCoy examined a number of patients at random, without knowing which were toxoid-treated and which were control cases. Tables 3 and 4 show the results of these examinations.

TABLE 3.—*Patients examined on July 24, 1941*

	Patients given toxoid	Controls
Slightly improved	2	3
Stationary or slightly improved	3	3
Stationary	10	15
Stationary or slightly worse	3	6
Slightly worse	2	2
Total	20	29

TABLE 4.—*Patients examined on November 21, 1941*

	Patients given toxoid	Controls
Improved	2	2
Slightly improved	4	0
Stationary	4	6
Slightly worse	1	0
Worse	3	0
Total	14	8

It can be seen from the preceding tables that there is no indication that the toxoid treatment had a favorable action on leprosy.

Sedimentation tests were run on all patients before treatment and at the 10-month check-up period. The Cutler technique was used. Results of the tests are shown in table 5.

TABLE 5.—*Sedimentation tests*

	Improved	Stationary	Worse
Groups given toxoid	6	22	7
Control group	7	24	4

If there were differences of less than 3 mm. in the tests run at the beginning and at the end of the 10-month period the condition was considered stationary. An increase of 3 mm. or more was listed as worse and a decrease of 3 mm. or more as improved. The results of the sedimentation test were more favorable in the control group.

While our experimental study is not complete, we have thus far seen no conclusive beneficial effects from diphtheria toxoid therapy in leprosy. It is proposed that the experimental treatment be continued for 2 months more, and then be followed by an observation period of 3 months before a complete report of the study is made. In the meantime, because of numerous inquiries on the subject, it was felt that a preliminary report showing the trend of diphtheria toxoid treatment in leprosy as observed at the United States Marine Hospital, Carville, La., would be of interest.

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THE EFFECTS OF DISTILLERY WASTES AND WATERS ON THE MICROSCOPIC FLORA AND FAUNA OF A SMALL CREEK[1]

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The immediate effects of sewage on the microscopic flora and fauna of streams have been shown by the works of Weston and Turner (*1*), Forbes and Richardson (*2*), Purdy (*3*), Aggersborg and Hatfield (*4*), Kolkwitz and Marsson (*5*), Kalmus (*6*), Seeler (*7*), Roy (*8*), Marsson (*9*), Liebmann (*10*), and many others. It seems well demonstrated that a quick rise in numbers and in species of organisms follows the admission of sewage except where the discharge is such that oxygen depletion results, in which case the stream population drops. Liebmann (*11*), Wetzel (*12*), and the writer (*13*) have shown, however, that oxygen-depleted streams have different, but smaller, populations. Volk (*14*) decided that pollution failed to affect the microfauna of the Elbe at Hamburg.

The writer (*15*) is of the opinion that there is a secondary effect of sewage. The immediate effects shown above seem to us to be due largely to the primary increase in bacteria, which become food supporting a large population of holozoic organisms. There is likewise an increase of saprozoic organisms, possibly due to the immediate decomposition products of organic matter. But farther downstream there is also an effect on holophytic organisms, due in part to the increased salts content, especially phosphates and nitrates. Volk might have been dealing with such an effect when she found no drop in stream population due to sewage. At any rate, the rivers we have investigated all show a marked increase of chlorophyll-bearing organisms at a considerable distance below the entrance of sewage.

The effects of sewage and other wastes would be much more apparent if we had a comprehensive knowledge of the plankton of clean streams. Unpolluted streams have been investigated by numerous workers, among them Butcher (*16*), Fritsch (*17*), Batard (*18*), Lemmermann (*19*), Bischoff (*20*), and others. Des Cilleuls (*21*) has summarized the various findings as to what governs the appearance of given plankton species in a stream. We are beginning to have a

[1] From the Division of Public Health Methods, National Institute of Health.

definite idea, but not yet a comprehensive knowledge, of what plankton species may be found in a given stream and, to a lesser extent, their comparative abundance.

Work on the biological effects of specific trade wastes added to streams deals mostly with fish. Aggersborg and Downer (*22*) have studied the effects of starch wastes on the microscopic flora and fauna. The writer (*23*, *24*) has studied the effects of sulfuric acid from coal mines. But there are almost no other investigations to give the biological background for such wastes as phenols, paper mill wastes, and many others. This paper is an introduction to the effects of distillery wastes on a small creek.

At Lawrenceburg, Ind., large whiskey distilleries are situated on the banks of Tanner's Creek. This is a small stream, about 21 miles long, rising in the flat country of northwest Dearborn County, Ind., and flowing through a deeply eroded valley to the Ohio River. In late summer its flow is only a few cubic feet per second, but in 3 years we have never seen the flow cease. The water is clear, except following rains, and has a pH of 7.4 to 8.2. It gets no wastes to speak of until the distilleries are reached, about 3 miles from its mouth. Above the distillery it supports a varied fish population. There are numerous quiet areas where plankton can develop. It might be termed a typical, pleasant, small creek of the Ohio River drainage basin. Table 1 shows its general biochemical nature during the second 6 months of 1939.

TABLE 1.—*Biochemical features of Tanner's Creek above and below distillery*

Date 1939	Temperature		Dissolved oxygen, percent saturation		5-day B. O. D.		Bacteria per ml, agar count 24 hrs. at 37° C.		pH	
	Above	Below	Above	Below	Above	Below	Above	Below	Above	Below
July 14	24 5	30 0	70 8	0 0	1 61	43 60	2,210	10,000,000	------	------
July 26	24 0	27 0	77 4	.0	1 16	70 00	2,280	7,860,000	------	------
August 10	21 0	26 0	70 5	.0	40	23 00	2,400	Spreaders	------	------
August 23	20 5	30 0	61 1	.0	1 52	47 25	21,600	8,150,000	7 4	7.5
September 20	18 0	27 0	61 1	.0	.78	162 40	7,900	23,000,000	7 5	7 1
October 18	17 5	27 0	105 1	.0	5 31	68 10	450	15,000,000	7.7	7 5
November 15	5 0	26 5	146 5	.0	3 31	114 50	710	4,300,000	7 6	7 4
December 27	1 0	30 0	106 5	.0	2.42	441 5	680	1,800,000	8.0	7.5

A few samples were taken from points in this creek in 1938 and 1939. In 1940 systematic sampling was undertaken and 96 samples were collected, many of them at weekly intervals. A few of these were taken when the stream was heavily flooded, and were discarded for that reason. For a short time also, high water in the Ohio precluded sampling, but the results of examining 84 samples are shown herein. Twenty-nine of these were obtained about 3 miles above the entrance of any distillery wastes (station A), 35 were taken about a quarter of a

mile below the lowest (station B) entrance of distillery wastes, and 20 were collected about a mile below this point (station C).

Station A may be from 3 hours to a day above station B in time of flow, but because there has always been a reasonably heavy flow between B and C, these two are separated by only a few hours at most. In all the samples collected 246 species, genera, or groups of fungi, algae, protozoa, and Rotifera were identified and their total numbers were counted. In every case 100 ml. of raw water were centrifuged and the catch saved and counted. The procedure followed has been described in a previous paper (*25*) and is believed to be accurate.

Table 2 shows the distribution of the various groups of organisms. Fifty-three species, or 22 36 percent, were each found only once in the 84 samples. Thirty-eight species, or 16.03 percent, each occurred in 2 of the 84 samples. But 155 species, or 61.61 percent, were found in 3 or more of the samples, 2 53 percent being common to 10 of the samples. Many species thus show a strong tendency to recur, and analysis and comparison of individual samples show that some organisms were found at one or more of the sampling points for weeks at a time. None of these seldom-occurring species ever flowered into great blooms *Oicomonas* sp numbered 280 per ml. of raw water on the single occasion when it was found, *Poteriodendron petiolatum* 120 per ml., and *Phacus anacoleus* 58 per ml. Some of the recurrent species far exceeded these numbers at times.

TABLE 2.—*Occurrence and distribution of microscopic organisms at three stations in Tanner's Creek*

Station A, above distillery, 29 samples, station B just below distillery, 35 samples, station C, 1 mile below distillery, 20 samples

Group or class or organism	Number species found	Number of species found at							Total occurrences of all species	Number of times species of group occurred at						
		A only	B only	C only	All 3	A and B	A and C	B and C		A only	B only	C only	All 3	A and B	A and C	B and C
Fungi	4	1			2			1	29	3		-	23			8
Myxophyceae	2	1			1				13	1			12			
Heterokontae	1	1							3						3	
Bacillariae	6	8		1	5		1	1	127	18		1	104		2	2
Dinoflagellata	4	2					2		13	5					8	
Chrysophyceae	19	8			8	2	1	1	137	21			97	14	5	
Cryptophyceae	6	1			2	2		1	81	3			60	14		4
Euglenophyceae	2	10	4		16	12			461	35	6		346	74		
Chlorophyceae																
Volvocales	0	9	1	1	9	6		4	314	31	1	1	205	32		43
Other	28	12		1	7	4	2	2	176	24		1	129	9	8	5
Mastigophora	19	3	3	1	6		1	5	163	4	3	1	107		2	47
Sarcodina	8	3	1			2	1	1	16	3	1			6		6
Infusoria	2	12	3	4	11	6	2	5	181	21	5	5	86	30	5	29
Rotifera	6	4	1			1			26	16	1			9		-
Total	227	76	13	8	67	35	10	20	1,740	184	17	9	1 169	188	33	139

The species found at station A also show a striking similarity to the plankton species found in other creeks and rivers of the Ohio River system, for example, the Scioto, Muskingum, Little Miami, Great Miami, White, and Wabash Rivers. In fact, only two species from this station, *Pyramidomonas reticulata* and the organism tentatively named *Lobomonas quadriciliata*, have not been found elsewhere by us. *Uroglenopsis* and *Ceratium hirundinella* have been far more common in this creek than in any other stream we have examined, but the former often constitutes a bloom in ponds or reservoirs and the latter is common to some rivers. The number of species found at station A is not as great as we have found in some other Ohio basin streams, but considering the small size of the creek it is a remarkably long list and lends support to the idea that there is a large and constant stream plankton, in some respects different from lake or pool plankton.

The species found at B and C show sharp differences from those at A. Seventy-six species were not found anywhere except at A, 13 only at B, and 8 only at C. Sixty-seven species were common to all three stations. Table 2 shows the number of times species occurred at each of the three stations. If we consider A as a clean water station and B and C as polluted water stations, the observations here are in accord with previous observations except with regard to the Rotifera which, being frequently bacteria eaters, might be expected at B and C in some abundance. Chrysophyceae and Cryptophyceae are sharply reduced at B and C, and Euglenophyceae fail to show a marked preference for pollution. Colorless flagellates, Volvocales and Infusoria, sharply predominate at the two lower stations.

There were only four fungi counted—the bacteria *Blastocaulis*, *Chromatium*, *Beggiatoa*, and *Sphaerotilus*. An attempt was made to count large spirilli and yeasts, but they were always abundant at the two lower stations and practically lacking at A. Numbers were so large that the attempt to count them was abandoned.

The predominance of some groups above and others below the distilleries is shown in table 3 and illustrates more clearly than table 2 the numerical differences in organisms above and below the sources of pollution. The average number of species per sample at A was 36.45, at B 16.80, and at C 14.80. The average number of organisms per ml. per sample at each station also emphasizes the drop in numbers. At A, 1,687 per ml. were found, at B, 1,008 per ml., and at C, 887 per ml. The consistent oxygen depletion might be an explanation of this decrease in numbers. However, many green forms as well as a variety of colorless ones can stand an oxygen depletion for a long time. The organisms peculiar to the two lower stations include

TABLE 3—*Station predominance and occurrence of organisms in Tanner's Creek in relation to entrance of distillery wastes*

Groups of organisms	Number of times any species of group occurred		
	Station A (Above distillery)	Station B (Just below distillery)	Station C (Mile below distillery)
Predominant above distillery			
Heterokontae	2		1
Bacillarieae	68	37	25
Dinoflagellata	11		2
Chrysophyceae	100	26	11
Cryptophyceae	51	23	7
Euglenophyceae	25[illegible]	157	49
Chlorophyceae except Volvocales	89	48	35
Rotifera	23	3	
Predominant below distillery			
Fungi	5	16	8
Myxophyceae	3	5	5
Chlorophyceae Volvocales	124	120	59
Mastigophora	42	84	46
Sarcodina	6	7	3
Infusoria	95	62	45

a number of these *Bodo caudatus*, *Cercobodo* sp , *Clautriavia parva*, *Hexamitus inflatus*, *Mastigamoeba* sp , *Tetramitus pyriformis*, and *Trepomonas rotans* or *agilis* are all colorless flagellates of this type and are common to the sludge compartment of Imhoff tanks or other situations where the organic content is high, oxygen is depleted, and H_2S and methane are present In fact, the common protozoa of the lower creek are such as occur in the anaerobic digestion of domestic sewage In addition, three species of green Volvocales are abundant, which we have never found in Imhoff tanks—*Chlamydobotrys* spp , *Chlorogonium euchlorum*, and *Chlorobrachis gracillima* The first two are occasionally present in unpolluted waters, but we have never found *Chlamydobotrys* abundant in other than polluted water (below sewage plants, vegetable canneries) and have never before found great numbers of *Chlorogonium euchlorum* *Chlorobrachis* was described by Korshikoff (see Pascher (*26*)) from "Bassins mit faulenden wasser" in Russia and he may have meant sewage digestion tanks We have found no other records of its occurrence, but for 3 months at least it was present in Tanner's Creek below the distilleries, on July 7, 1940, reaching 1,360 per ml at station B

From the data in table 1 it appears that there are several drastic changes introduced by the distillery wastes which might affect the plankton population of the creek Temperature of the water jumps as much as 25 degrees at times, and such sudden changes are demonstrably fatal to many micro-organisms On July 9, 1940, the temperature increased from about 22° C to 36° C and only about 12 percent of the *Chlorobrachis* were alive Nevertheless, they and 32 other species were alive and apparently thriving on July 10 at a temperature of 38° C. Although the sudden changes over such a range may

kill much of the population brought downstream by the current, yet enough are left alive so that thorough re-seeding occurs.

Oxygen depletion also may be fatal to a large number, yet many of the organisms found at B and C during the past year are most emphatically not characteristic of oxygen-deficient environments. If they are green, they are safe during daylight hours, but for most colorless organisms oxygen depletion is another of the damaging influences introduced by the distilling wastes. The measure of change is evidenced by the large number of anaerobic forms which make their appearance.

A third change is the increase in biochemical oxygen demand. How much of this increase is due to soluble organic matter, or to dead organic matter we do not know, but in addition to such materials the waste water contains large quantities of dead and living yeast cells. Laboratory experiments on the aerobic and partly anaerobic digestion of distillery wastes have shown a huge and expected development of yeasts.

A fourth change is the huge bacterial population immediately produced. Bacteria crowd algae and protozoa out of existence if too abundant because they deplete oxygen, alter pH, etc. Frequently it is evident that the numbers of bacteria in the distillery-waste laden waters approach those of organic infusions, and this high bacterial population may be another factor, induced by the distillery wastes, tending to reduce the normal stream flora and fauna.

The fifth change is chemical. Detailed analyses are not available for samples above and below the distilleries, but the changes in phosphorus are one evidence of this. Thus on September 10, 1940, the phosphate content of the creek water, in parts per million, was 0.08 at station A, 11.25 at station B, and 4.60 at station C. On October 8, 1940, the phosphate values at these three stations were, respectively, 0.06, 13.20, and 2.00 parts per million. Other data show that the phosphate (soluble phosphorus) content may jump from a few hundredths of a part per million to a thousand times that value, and that it rises to one part per million or more above the distilleries only after a rain, when the creek is high. Increasing the phosphorus content of natural waters normally increases the plankton, but in this case we must conclude that its beneficial increase is offset by other detrimental factors. Another evidence of chemical change is the evolution of methane and H_2S in the creek below the distilleries.

The nature of the changes induced in the water appears then to be unfavorable to the greater part of the plankton. Some few groups, as shown in table 3, apparently find distillery waste waters a favorable habitat. Most of these groups are comprised of organisms which favor an anaerobic habitat, or one in which the oxygen content is low, including such genera or species as *Polytoma uvella*, *Trepomonas*

agilis, *T. rotans*, *Tetramitus pyriformis*, *Hexamitus inflatus*, *Mastigamoeba*, *Bodo* and *Cercobodo*, *Enchelys vermicularis*, *Trimyema compressum*, and *Metopus*. Others are those found in waters of high organic content, as the bacteria *Chromatium*, *Beggiatoa*, and *Sphaerotilus*. One of the Cryptophyceae occurs in some numbers at the lower stations and not at A. But it is the colorless *Chilomonas paramecium* which, in contrast to other Cryptophyceae, thrives in organic infusions. The colorless Chrysomonad, *Physomonas vestita*, behaves in a similar manner. Many species of Euglenophyceae appear to be tolerant to the distillery waters, while *Euglena polymorpha* and *E. viridis* were actually more abundant at the lower stations. But at extreme low flows late in summer, when the creek was largely made up of distillery wastes, even these tolerant forms tended to disappear from the lower stations.

A similar tolerance was noted for some of the nonmotile Chlorophyceae and some of the Volvocales, such as *Eudorina elegans*, *Heteromastix angulata*, *Pandorina morum*, and *Thoracomonas phacotoides*. Very few of the diatoms were found at the lower stations, although *Melosira granulata* was most abundant at the lowest station. Of the Sarcodina, *Hartmanella hyalina*, found in small numbers at B and C, was not found at A. The commonest tolerant Ciliata at B and C were those forms common to sewage as *Chilodonella*, *Colpoda*, *Colpidium*, *Oxytricha*, and *Paramecium*.

Excluding the tolerant forms, those which are characteristic of waters with a high organic content and those characteristic of oxygen-depleted waters, only five genera of algae and protozoa have appeared persistently and in some numbers below the entering waters of the distilleries. These are the Volvocales, *Chlorobrachis gracillma*, *Chlorogonium euchlora*, and *Chlamydobotrys* spp., together with two ciliates, *Oxytricha*, probably the species *chlorelligera*, and a *Spathidium* resembling *viride*. It is noteworthy that these last two contain zoochlorellae, and might be able to furnish a part at least of their own oxygen.

It appears then that the waters and wastes from these distilleries tend to reduce the plankton content of the creek; that some plankters are tolerant, at least for a short distance, of the distillery wastes, as long as those wastes do not become too concentrated or raise the temperature too greatly; that a group of organisms favoring water of a high organic content and another favoring oxygen-depleted waters partly replaces the normal stream plankton; and that five algae and protozoa were found for some time and in relative abundance in these waste waters, although we have never encountered them in abundance elsewhere. Whether or not these last five organisms are characteristic of distillery wastes may only be anwered by a study of other streams polluted by such wastes.

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THE RELATION OF PLANTS TO MALARIA CONTROL

With Special Reference to Impounded Waters

By WILLIAM T. PENFOUND [1]

In malaria control, procedures may be directed against the malaria parasite or its anopheline vector, or they may be designed to protect the human host from the bite of infected mosquitoes. Aquatic plants play a dominant role in the malarial triangle inasmuch as they provide food and shelter for the larvae of the vector. It follows, therefore, that the task of the plant scientist is to determine the relation of each species to anopheline propagation and to devise methods of reducing objectionable species to an innocuous state. The following discussion is a summary of the plant investigations carried on by the Tennessee Valley Authority during the summers of 1937 to 1940, inclusive.

RESERVOIR PREPARATION

Tolerance of trees to inundation.—It has been stated recently that "mosquito control is built into the design of our dams, into the preparation of our reservoirs, and into the operation of our lakes" (*1*). Since vegetation is the cornerstone of mosquito propagation, it is obvious that plant control is of paramount importance in the above operations. In reservoir preparation it has been considered axiomatic that complete clearing is absolutely essential to reasonable mosquito control after impoundage. However, it has been discovered that certain trees just above normal pool level are killed by the increased water elevation in new impoundments. An investigation on the effect of impoundage on trees was initiated in 1937 and completed in 1939. Studies have been made in two limesinks, in two ponds whose water level was raised by the Wheeler impoundment, and in three of the reservoirs of the Authority. The data taken included height of the tree or its sprouts, health of the plant, the depth of the water, and the duration of the hydroperiod. Approximately 2,000 observations were made during the summers of 1937 and 1938. This investigation resulted in the delineation of trees into three classes of tolerance—tolerant, moderately tolerant, and intolerant. The tolerant class includes those trees which thrive for two or more growing seasons in water which averages one foot or more in depth. The moderately tolerant species do not survive the above conditions for as long as two growing seasons, and the intolerant trees succumb in less than one growing season, usually in less than two months.

The tolerant group includes not only aquatic trees but also several floodplain species and one upland species (persimmon). The moderately tolerant class comprises both bottomland and upland species,

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including the loblolly pine. Even the intolerant group includes some species which thrive in flood plains but which are very intolerant of summertime flooding. Notable among these are black walnut, American beech, yellow poplar, white oak, and sugar maple. On the basis of these studies it has been agreed that no clearing of tolerant and moderately tolerant trees should be carried out above the maximum summertime pool elevation. On the other hand, it has been recommended that all intolerant species be removed for some distance above the maximum pool level since dead trees or their parts constitute a mosquito hazard when they fall into the reservoir. These species, in order of decreasing tolerance to flooding, are as follows: White ash, chestnut oak, mockernut hickory, shagbark hickory, ironwood, black locust, sassafras, flowering dogwood, sourwood, southern red oak, Spanish oak, blackjack oak, Schneck's oak, wild black cherry, shortleaf pine, scrub pine, red cedar, redbud, black walnut, American beech, yellow poplar, white oak, sugar maple, and post oak.

Growth of coppice.—The clearing of a reservoir usually occupies a period of two or three years. During this period, or any considerable portion thereof, the stumps in the marginal area produce new shoots of such a height as to create a major malaria hazard subsequent to closure of the dam. Observations on the growth of coppice were first made in the Pickwick Reservoir in the autumn of 1937. In the same year, opportunities were afforded in the Wheeler Reservoir to determine the effect of flooding and rebrushing on coppice growth. In addition, a detailed investigation, involving over 5,000 measurements, was conducted in the Guntersville Reservoir from March 1 to October 15, 1938. Monthly measurements were made on coppice in areas cleared at monthly intervals and information was obtained on the effect of log-burning on coppice production and on the seasonal march of growth in the various species. As a general rule, only about 60 percent of all the stumps produced coppice, due, to some extent, to the burning of logs on the area, but mainly to the fact that stumps over twelve inches in diameter produced few or no sprouts. The growth of shoots was initiated as early as March 15, was greatest in early spring, decreased gradually throughout the growing season, and ceased by October 15. The average growth for all species was about 0.33 inches per day. The growth rate was greatest in the tolerant group, and considerably lower in the semitolerant and intolerant species. These facts have enabled the personnel charged with reservoir clearance to predict the height of the coppice just before closure and to set the time for rebrushing operations at the various elevations in such a sequence as to prevent a mosquito hazard after impoundage.

Poisoning of willow stumps.—Among the tolerant trees, the black willow grows so fast and survives inundation so well that it has been

subjected to routine stump poisoning. As a general practice, the stumps are thoroughly frilled (hack-girdled) and a plant poison is poured or sprayed into the trough produced. Sodium arsenite in dilute solution gave excellent results but presented such a hazard to man and livestock as to demand a less toxic arboricide. Of twenty arboricides tested, several have proved satisfactory. These are larvicidal oil, coal tar oil, kerosene, four fuel oils, two phenolic compounds, and sodium chlorate. It should be pointed out that the preparation of the stump is more important than the arboricide utilized. This is confirmed by the fact that it is virtually impossible to poison stumps which are too small to frill properly.

Shoreline clearing.—The final procedure in reservoir preparation is a thorough cleaning of the shoreline, especially in the zone of fluctuation. In the beginning, the plants, or dead plant parts, were cut, raked, piled, and burned by hand. At present, however, as much of this work as possible is being done by mowing machines and hay-rakes, drawn by horses or tractors. This has necessitated low cutting of stumps in the area treated. This practice has the added advantage of reducing the amount of coppice from stumps and it is hoped that the poisoning of willow stumps will be obviated thereby.

RESERVOIR MAINTENANCE

Control of coppice.—In a reservoir that has been thoroughly prepared, the shoreline will be nearly devoid of dead plants or their parts and excellent mosquito control may be expected during the first growing season if the stranding of drift and flotage has been adequate. The maintenance of a clean water surface is difficult, however, because of the production of coppice and colonization by aquatic plants. Although stumps never produce coppice when continuously submerged, many species produce abundant shoots if dewatered even as late as the middle of the growing season. Fortunately, the stumps of intolerant trees do not produce sprouts when inundated for extended periods. Furthermore, stumps produce fewer and smaller sprouts in deeper water. These facts suggest that trees should be cut as close to the ground as possible in order to destroy a maximum number of stumps and to decrease the growth rate of coppice on the remainder. In certain areas of our reservoirs it has been necessary to resort to rebrushing to obtain satisfactory mosquito control. A comparison of shoots on rebrushed stumps with those produced immediately after clearing revealed about a 25 percent lower growth rate. Furthermore, a second rebrushing reduced the growth rate by another 25 percent. Such a rebrushing operation, including the cutting, piling, and burning of coppice and herbaceous growth, can be executed most economically by mowing machines and

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hay-rakes. Approximately 0.15 machine day is required per acre. Where the operation is carried out manually 2.5 man days (8-hour day) per acre are required. It has been observed, however, that rebrushing alone will never eliminate coppice completely. On the other hand, grazing animals have been observed to reduce large stands of coppice to the vanishing point. It is possible, therefore, that grazing animals may be of value in the control of anopheline mosquitoes by reducing the vegetative cover along our shorelines.

Herbaceous plants important in anopheline breeding.—As compared with coppice, wetland and aquatic herbaceous plants present a much more serious mosquito control problem. Hinman (*2*) states: "*Anopheles quadrimaculatus* breed almost exclusively in aquatic and semi-aquatic vegetation or in flotage (fine drift composed mostly of vegetable debris). If these two sources of protection to the larvae could be removed or controlled, our problems of malaria control in the Southeastern States would be practically solved." The wetland (semi-aquatic) species are important in the breeding of anopheline species only when the reservoir level is near, at, or above the summertime elevation. The most important of these species are purple grass, *Panicum agrostoides*; saw grass, *Homalocenchrus oryzoides*; hop sedge, *Carex lupulina*, weak rush, *Juncus effusus*; and the spike rush, *Eleocharis obtusa*. The emergent aquatics include plants with erect, leafy stems, such as the willow-weed, *Dianthera americana*, and the lizard's tail, *Saururus cernuus*. Another group of emergents are plants with both horizontal and erect leafy stems. In this category the alligator grass, *Achyranthes philoxeroides*, and the water purslane, *Isnardia palustris*, are the most troublesome. In the third type of emergent aquatics, rhizomes produce leaves which either lie on the water surface or are projected above it. In this group the cow-lily, *Nymphaea advena*, and the lotus, *Nelumbo lutea*, are proving to be two of our greatest problems. Of the submerged aquatics, the most widespread species among which anopheline larvae have been found are the hornwort, *Ceratophyllum demersum*, and the water milfoil, *Myriophyllum pinnatum*. During the summer of 1941 a detailed study was inaugurated on the relation between plant species and anopheline breeding.

Colonization by aquatic plants.—Although a new impoundment greatly increases the potential habitat of the above-mentioned species, there are relatively few sources of migrules. An opportunity is thus afforded to prevent the colonization of obnoxious species in new reservoirs or portions thereof. Our observations show that the colonization of certain aquatic plants has been phenomenal (*3*). Alligator grass was first noted in Lake Wilson in 1933, but had reached practically all parts of the reservoir by 1938. It was discovered in the Elk River Basin of the Wheeler Reservoir in the autumn of 1938 and was

observed for the first time in the upper part of Pickwick Reservoir in the autumn of 1939. At the present time, several hundred patches of this obnoxious weed have been spotted in each of these reservoirs. The elimination of this species from Wheeler and Pickwick Reservoirs is considered necessary, but much thought, time, and money will be required to carry out this difficult task. The colonization rate of lotus is even more phenomenal, but space precludes a discussion of our observations on this species. The above discussion should be sufficient, however, to indicate that an annual shoreline survey is imperative. In this survey location and extent of obnoxious plants are indicated in color on maps selected by the sanitary engineer. In addition, such other operations as drift removal, erosion clearing, marginal drainage, and rebrushing are added by the resident engineers.

Fluctuation and colonization.—In connection with the studies by Hinman (*2*), a considerable number of observations have been made on the effect of cyclical fluctuation and seasonal recession on the colonization of plants. In general, it may be said that cyclical fluctuation has little effect on the growth of plants except that most submerged aquatics are killed and a slight extension of emergent aquatics is occasioned. It is probable, however, that a wide fluctuation is unfavorable to the ecesis of any aquatic plants. Regarding the effect of seasonal recession, all submerged species are eliminated from the dewatered zone, although recolonization is attempted annually. The emergent species, however, extend farther lakeward each year until a maximum extension is attained. Terrestrial species, also, invade the dewatered zone but are killed by the subsequent progression of water level. Observations in certain other reservoirs with a wide recession zone indicate that the ecesis of submerged aquatics and of most emergent species is prevented. A considerable flood surcharge may be conducive to the rapid colonization of certain aquatic plants, a notable example being the spread of alligator grass in Pickwick Reservoir.

Methods of plant control.—The methods of control of herbaceous plants are still in process of evolution. The present methodology includes removal, recurrent cutting and herbicides. Removal by digging, raking, pulling, or by a dragline is successful only when all the vegetative parts are taken out and properly disposed of. Digging has been utilized successfully on the giant cut grass but has not been effective with the willow-weed. Pulling has proved an effective means of removing cattail and raking has been successful in the control of the water-shield. Removal by a dragline has proved a failure in the case of the willow-weed and is not to be recommended for other obnoxious species.

The other mechanical means of control is that of periodic and recurrent cutting. Experiments on the lotus and cow-lily indicate that it is comparatively easy to destroy these species in the relatively turbid water of most of our reservoirs, especially where the water is more than two feet deep. It is necessary only to cut off the leaf blades, usually just below the water surface, at intervals of three weeks until the plants are eliminated. The flotage produced has not proved a problem since most of it is stranded on the shore and the remainder sinks to the bottom in four to seven days. An interval of three weeks between cuttings is selected since by this time the new leaves have come to the surface and anopheline breeding may have begun. Since the cost of cutting by motorized equipment is very low, it is probable that this method may be used as an antilarval measure in situations where eradication is impossible. Experience on the Wheeler Reservoir with a Hockney underwater weed cutter has demonstrated that one machine with one operator and one tender can cut approximately 5 acres per day. It should be emphasized that early discovery of small colonies and thorough treatment is necessary if mechanical control is to be successful.

Herbicidal investigations in our reservoirs have revealed much of interest and promise in plant control. In the growing seasons of 1936 and 1937 large scale experiments were carried on to determine the effectiveness of sodium arsenite on the willow-weed. It was found that a given amount of sodium arsenite assiduously applied as a weak solution (3 percent) to a given area gave better results than when applied in a concentrated solution. Powdered sodium arsenite on wet soil, or in water in which the plants were growing, destroyed plants effectively. It was from this fact that the idea of airplane application of herbicides was derived. Calcium arsenite, applied by airplane at rates of 50 and 250 pounds per acre, destroyed nearly all the leaves on all plants and killed most of the coppice to the ground line. Although considerable resprouting occurred, the success of the experiment was remarkable in view of the low solubility of calcium arsenite. An experiment designed to test the possibility of using small amounts of calcium arsenite as a larvicide-herbicide proved unsuccessful. On the other hand, monthly applications of sodium arsenite at the rate of 8 pounds per acre have reduced the vegetative cover from about 75 percent to less than 25 percent and have completely destroyed much of the coppice in the area treated. It is probable that this method might be utilized in large areas, especially as an adjunct in opening up the vegetative cover for effective larvicidal dusting.

Despite the demonstrated effectiveness of sodium arsenite as an herbicide, a concerted attempt is being made to develop herbicides which are less toxic to man and domestic animals. During the current

season, ten herbicides have been tested in some detail and five have demonstrated considerable promise as liquid herbicides. These include an emulsion of sodium arsenite and fuel oil, two fuel oils, and two phenolic compounds. What is needed next is a powdered herbicide which can be applied by airplane and which is relatively nontoxic to man and livestock. Herbicides hold considerable promise for the future, especially where they can be utilized at low rates of application to check plant growth and thereby restrict anopheline breeding.

SUMMARY

The main objective of the biological investigations has been to obtain mosquito control through proper reservoir preparation and adequate reservoir maintenance with constantly diminishing reliance on larvicides. In the field of reservoir preparation, it has been possible to delineate trees on the basis of their ability to withstand flooding and thus to remove the intolerant species before impoundment. The determination of the seasonal growth of coppice has enabled the personnel charged with reservoir clearance to set the time for rebrushing operations in order to prevent a mosquito hazard subsequent to closure of the dam. The technique of willow stump poisoning has been improved and less toxic arboricides have been tested. These, and other biological researches on reservoir preparation, have yielded significant dividends in lowered maintenance costs.

The rigid control of obnoxious shoreline vegetation is almost synonymous with adequate reservoir maintenance. The fact that coppice does not grow from completely inundated stumps and grows slowly when a considerable portion of the stump is immersed has led to the practice of low cutting of stumps. Rebrushing has been shown to decrease the growth rate of coppice and heavy grazing has been observed to eliminate coppice completely. Herbaceous plants present a much more serious mosquito control problem. To date, the worst offenders have been delineated and are being subjected to detailed life history studies. The rates of colonization are also being determined, especially in relation to the fluctuation schedules being employed. At present the methods of plant control involve removal, recurrent cutting, and the application of herbicides. Of the three methods, recurrent cutting has yielded the greatest returns but is applicable only to cow-lily and lotus. Of the liquid herbicides, sodium arsenite has proved most effective, but five other less toxic plant poisons have demonstrated considerable promise. Airplane application of powdered herbicides has proved successful in opening up vegetation for more effective antilarval measures and possibly may be utilized to reduce plant growth sufficiently to obviate the use of larvicides.

On the basis of our experience, the following suggestions are offered. Complete clearing to the maximum summertime pool level and a thorough autumn clean-up just preceding wintertime impoundment is prerequisite to effective mosquito control during the first two or three seasons in the life of a reservoir. Fundamental to adequate reservoir maintenance is the delineation and investigation of the most important obnoxious plants. As soon as this is done an intensive campaign to prevent or to limit the colonization of certain critical species should be undertaken. It should be pointed out that early discovery, proper treatment, and continuing vigilance are all important in such a program and that the field personnel should be thoroughly schooled in the various aspects of the problem. If it is impractical to prevent colonization, as may be the case with native species of wide distribution, attenuation by herbicides should be employed.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

January 4-31, 1942 [1]

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended January 31, 1942, the number reported for the corresponding period in 1941, and the median number for the years 1937-41.

DISEASES ABOVE MEDIAN PREVALENCE

Meningococcus meningitis.—For the 4 weeks ended January 31 there were reported 230 cases of meningococcus meningitis as compared with 163, 129, and 212 cases for the corresponding period in 1941, 1940, and 1939. An increase of this disease is normally expected at this season of the year, but the current figure is the highest for this

[1] The data contained in these reports are based upon thirteen 4-week periods with the first week in each year ending between the 4th and the 10th of January. This of necessity makes an extra week in an occasional year over a period of years as was the case in 1941. The first week used in the current 4-week period ended January 10, that being the first 7-day week in 1942.

period in 4 years. The States having the highest number of cases were widely scattered, viz, New York, 25 cases; California, 19; Maryland and Texas, 18 each; Pennsylvania, 16; Virginia, 14; Massachusetts, 12; and Ohio, 8 cases. No other State reported more than 5 cases.

Poliomyelitis.—During the 4-week period there were 109 cases of poliomyelitis reported, which was only about 75 percent of the number reported in 1941 but about 10 percent above the seasonal average for this period. The incidence in the North Atlantic regions was still considerably above the normal seasonal incidence, while other regions either closely approximated the 1937–41 median figures or fell below them. Since the North Atlantic regions were the last affected by the recent rise of this disease, the decline to the normal level would naturally be later there; further declines may be expected in all sections of the country as the lowest incidence is usually reached during April and May.

Whooping cough.—Whooping cough was slightly more prevalent than it was during this period in 1941 and also about 20 percent above the 1938–41 average seasonal incidence. In 6 of the 9 geographic regions the number of cases was higher than the normal seasonal expectancy and in 3 of them it was lower. For the country as a whole the reported cases totaled approximately 17,000, which was the highest incidence for this period in 3 years.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—For the 4 weeks ended January 31, the number of reported cases (1,481) of diphtheria was more than 20 percent in excess of the number recorded for the corresponding period in 1941, but it was only about 60 percent of the 1937–41 median incidence for this period. All regions except the Middle Atlantic, West North Central, and Pacific reported excesses over the 1941 figures for this period. In all regions, however, the number of cases was below the 1937–41 median incidence, very significant decreases being reported from the East North Central and South Atlantic regions.

Influenza.—For the current period there were 16,925 cases of influenza reported, as compared with approximately 384,000, 52,000, and 13,000 cases for the corresponding period in 1941, 1940, and 1939, respectively. The highest incidence is still confined to the South Central and South Atlantic regions. Of the total number of cases, Texas reported 6,319, South Carolina, 2,267, Alabama, 1,535, Virginia, 1,448, Arkansas, 857, and Oklahoma, 614 cases. More than three-fourths of the total cases were reported from those 6 States. For the country as a whole the incidence was less than 5 percent of that recorded for the corresponding period in 1941 and less than 35

percent of the seasonal expectancy While the incidence was high in the States mentioned, in no section of the country was the incidence as high as the 1937–41 average incidence for this period.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period Jan 4–31, 1942, the number for the corresponding period in 1941, and the median number of cases reported for the corresponding period, 1937–41

Division	Current period	1941	5-year median	Current period	1941	5 year median	Current period	1941	5 year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	1 481	1 220	2 489	16 925	383 630	51 859	36 328	40 418	36 655
New England	28	9	50	21	10 051	124	2 720	2 030	2 583
Middle Atlantic	174	180	360	97	1 430	302	7 049	17 959	5 143
East North Central	233	179	441	480	10 012	4 595	2 650	13 144	13 144
West North Central	94	131	138	176	12 169	1 079	3 187	1 473	1 976
South Atlantic	314	250	487	4 497	114 502	7 313	6 712	2 171	2 776
East South Central	147	109	174	1 900	72 709	4 488	606	1 140	900
West South Central	357	232	377	7 835	147 509	10 968	4 912	524	989
Mountain	65	58	73	1 181	21 699	2 383	2 161	1 061	1 390
Pacific	69	72	143	738	13 549	2 143	6 331	908	908
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	230	163	212	109	143	100	13 722	12 674	20 581
New England	23	10	10	7	1	1	1 434	779	1 134
Middle Atlantic	49	29	47	21	23	8	3 004	3 314	4 190
East North Central	21	18	22	21	60	16	4 134	4 229	7 710
West North Central	11	8	13	9	17	10	1 491	1 200	2 593
South Atlantic	53	34	46	10	28	18	1 275	1 111	1 150
East South Central	19	22	36	10	11	11	783	688	629
West South Central	24	22	22	11	11	11	391	352	533
Mountain	7	4	17	7	7	3	407	342	631
Pacific	23	16	16	13	12	14	653	599	1 398
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	61	190	1 144	315	312	458	17 374	16 857	[3] 15 159
New England	0	0	0	21	9	17	2 266	1 551	1 588
Middle Atlantic	0	0	0	41	42	77	4 667	4 481	4 379
East North Central	13	64	194	34	46	45	4 427	3 647	3 197
West North Central	26	76	450	10	28	28	756	947	817
South Atlantic	1	3	8	84	48	87	2 082	2 695	2 160
East South Central	2	5	6	26	26	30	501	466	381
West South Central	11	9	47	70	66	101	482	868	660
Mountain	5	25	128	9	22	24	743	560	641
Pacific	3	8	120	20	25	25	1 450	1 642	1 335

[1] Mississippi New York and Pennsylvania excluded New York City included
[2] Mississippi excluded
[3] 4 year (1938–41) average

Measles —The incidence of measles was also relatively low, 36,328 cases being reported, as compared with 40,418 during the corresponding period in 1941 and an average of 36,665 cases in the years 1937–41. A very significant decline in the number of cases was reported from the East North Central region, with a minor decline in the East South Central region, but all other regions reported a relatively high incidence The highest incidence was reported from the Middle Atlantic, South Atlantic, West South Central, and Pacific regions.

Scarlet fever.—The number of reported cases (13,722) of scarlet fever was approximately 1,000 more than was reported for this period in 1941, but the number represents a decline of more than 30 percent from the average seasonal incidence. A few more cases than might normally be expected occurred in the New England, South Atlantic, and East South Central regions, but in other regions the incidence was relatively low.

Smallpox.—The total of 61 cases of smallpox reported was the lowest on record for this period. The situation was favorable in all sections of the country. A peak of approximately 6,500 cases of smallpox was reached during this period in 1930, followed by a decline to approximately 500 cases in 1934. In 1935 an upward turn began and a lower peak of 2,435 cases was reported during the period corresponding to the current one; this has been followed by a steady decline to the current figure.

Typhoid fever.—While the incidence of typhoid fever stood at about the 1941 level, the number of cases (315) was only about 70 percent of the 1937–41 average incidence. The New England region alone reported an excess of cases over the expected seasonal incidence.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended January 31, based on data received from the Bureau of the Census, was 13.0 per 1,000 population (annual basis). The rate for the corresponding period in 1941 was 13.6 and the average rate for the years 1939–41 was 13.3. During the first 2 weeks of the period under consideration the rate was slightly higher than in 1941, but for the last 2 weeks the rates were 12.7 and 12.4, respectively, compared with 13.5 and 13.9 for the corresponding periods in 1941. The high rates of last year were due, in part at least, to the high incidence of influenza all over the country. While a few States have reported a large number of cases of influenza this year, it has apparently been a very mild form, as reflected in the death rates.

PROVISIONAL MORTALITY RATES FOR THE FIRST 9 MONTHS OF 1941—MATERNAL MORTALITY RATES—A CORRECTION

In the table showing the provisional mortality rates for certain causes during the first 9 months of 1941 and two prior years (Public Health Reports for February 6, 1942, page 199), the maternal mortality rates were incorrect. The correct rates are as follows: January–September 1941, 3.1; 1940, 3.7; 1939, 3.9; January–March 1941,

3 1, 1940, 4 1; 1939, 4 2; April–June 1941, 3.3; 1940, 3 9; 1939, 3.9; July-September 1941, 3 0; 1940, 3 3; 1939, 3 5.

The error was due to the use of the incorrect number of births in the original computation.

DEATHS DURING WEEK ENDED FEBRUARY 7, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Feb 7, 1942	Corresponding week, 1941
Data from 88 large cities of the United States		
Total deaths	8 879	10,229
Average for 3 prior years	9 988	
Total deaths, first 5 weeks of year	46 621	50,338
Deaths per 1 000 population first 5 weeks of year, annual rate	13 0	14 1
Deaths under 1 year of age	533	528
Average for 3 prior years	548	-------
Deaths under 1 year of age first 5 weeks of year	2 824	2,766
Data from industrial insurance companies		
Policies in force	64 898 360	64 686 023
Number of death claims	13 086	13 835
Death claims per 1 000 policies in force annual rate	10 5	11 2
Death claims per 1 000 policies first 5 weeks of year annual rate	10 4	11 2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED FEBRUARY 14, 1942

Summary

Of the important communicable diseases for which weekly records for prior years are available, only measles, typhoid fever, and whooping cough were above the 5-year (1937–41) median incidence. A total of 93 cases of typhoid fever were reported, as compared with 43 and 64 cases, respectively, for the corresponding weeks of 1941 and 1940, and with a 5-year median of 87 cases. Georgia reported 28 cases and New York 9, with the remainder scattering.

The number of reported cases of influenza declined. A total of 5,180 cases was reported as compared with 5,667 for the preceding week. Texas reported 1,818 cases, South Carolina 784, Alabama 659, and Virginia 385. Only two other States—Arkansas and Wyoming—reported more than 200 cases. Measles (14,062 cases) continues slightly above the median (12,954) but below last year's figure (18,308) for the corresponding week.

The incidence of poliomyelitis declined from 29 to 16 cases, and meningococcus meningitis decreased from 60 to 42. Both diseases are below the 5-year median expectancy. Only 13 cases of smallpox were reported, as compared with 17 for the preceding week and a 5-year median of 371 cases.

Two cases of anthrax were reported in Pennsylvania, and 2 cases of leprosy, 1 each in Indiana and Louisiana. Of 67 cases of bacillary dysentery, 29 occurred in Texas and 19 in New York. Other reports include 19 cases of tularemia, 46 cases of endemic typhus fever, and 1 case of trichinosis (in Maryland).

The crude death rate for the current week for 88 large cities in the United States is 12.5 per 1,000 population, as compared with 12.4 for the preceding week and a 3-year average of 13.7.

Telegraphic morbidity reports from State health officers for the week ended February 14, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Feb. 14, 1942	Feb. 15, 1941		Feb. 14, 1942	Feb. 15, 1941		Feb. 14, 1942	Feb. 15, 1941		Feb. 14, 1942	Feb. 15, 1941	
NEW ENG.												
Maine	0	0	3	------	112	11	264	122	122	3	0	0
New Hampshire	0	0	0	-----	-----	------	15	4	44	1	0	0
Vermont	1	0	0	-----	----	------	3	29	27	0	1	0
Massachusetts	3	2	2	-----	--	-----	430	454	454	0	2	2
Rhode Island	0	1	1	-----	1	--	82	0	13	0	0	0
Connecticut	0	0	1	8	90	26	169	84	108	1	0	0
MID. ATL.												
New York	26	15	30	[1] 14	[1] 182	[1] 50	404	3,375	673	3	10	6
New Jersey	4	7	12	22	704	54	167	1,076	464	2	0	0
Pennsylvania	14	20	35		---	----	1,083	3,189	170	5	4	7
E. NO. CEN.												
Ohio	13	2	20	16	272	202	222	395	46	1	0	3
Indiana	10	12	17	44	113	113	57	222	14	2	2	2
Illinois	15	18	32	23	127	128	230	1,995	37	0	1	1
Michigan [2]	3	5	12	1	120	24	173	1,965	323	1	1	1
Wisconsin	2	1	1	44	731	112	328	769	708	1	0	0
W. NO. CEN.												
Minnesota	1	5	3	-	240	4	570	10	20	0	0	1
Iowa	2	7	7	9	321	86	102	162	154	0	0	0
Missouri	2	5	10	6	38	59	85	86	15	3	1	1
North Dakota	4	3	1	32	113	20	134	6	6	0	1	1
South Dakota	4	0	0		9	9	16	31	2	0	0	0
Nebraska	1	4	4	2	8	--	41	1	21	0	0	0
Kansas	6	3	11	7	105	82	291	230	230	0	0	1
SO. ATL.												
Delaware	1	0	1	---	--	-	0	110	24	0	0	0
Maryland [2]	6	7	9	22	349	131	462	60	60	2	4	3
Dist. of Col.	4	0	5	2	37	19	19	31	21	0	0	0
Virginia	10	6	19	385	4,018	553	148	1,060	163	0	2	4
West Virginia	5	5	7	43	294	294	641	112	23	0	3	3
North Carolina	15	12	20	16	529	115	1,171	257	257	2	0	2
South Carolina	6	2	8	784	2,217	1,041	151	64	32	2	0	1
Georgia	16	4	11	152	919	486	874	248	248	1	1	1
Florida	9	4	5	3	220	5	161	58	58	0	0	0
E. SO. CEN.												
Kentucky	1	4	6	10	396	136	48	599	108	0	2	3
Tennessee	6	13	13	63	533	533	55	155	155	2	7	4
Alabama	6	7	7	659	1,698	920	198	140	148	1	3	8
Mississippi [2]	3	5	6	-	---	-----	-- --	-----	-----	0	0	1
W. SO. CEN.												
Arkansas	6	8	8	[3] 293	1,453	1,048	[3] 270	38	38	1	0	2
Louisiana	3	4	6	23	168	168	112	8	3	0	0	1
Oklahoma	4	4	4	100	395	395	321	7	15	2	0	1
Texas	62	31	41	1,818	1,910	1,910	2,025	463	304	1	2	8
MOUNTAIN												
Montana	6	6	3	14	51	42	96	6	7	0	0	0
Idaho	0	0	0	--	93	5	37	8	26	0	0	0
Wyoming	0	0	1	227	103	----	62	20	20	1	0	0
Colorado	9	12	12	29	78	27	128	106	61	0	0	0
New Mexico	1	6	3	1	94	9	55	136	51	0	1	0
Arizona	0	5	5	153	211	211	151	0	7	0	0	1
Utah [2]	0	2	0		114	10	44	31	81	0	0	0
Nevada	0	0	-----	-----	-------	-------	15	2	-------	0	0	-----
PACIFIC												
Washington	1	5	2	---	21	4	41	93	93	0	0	1
Oregon	1	1	1	18	37	70	94	193	34	0	1	0
California	13	20	24	137	1,239	771	2,317	98	185	4	0	1
Total	30[illegible]	283	[illegible]50	5,180	20,463	16,557	14,062	18,308	12,954	42	49	69
6 weeks	2,109	1,820	3,518	27,772	407,785	89,107	64,741	82,009	61,192	332	295	323

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended February 14, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Feb. 14, 1942	Feb. 15, 1941		Feb. 14, 1942	Feb. 15, 1941		Feb. 14, 1942	Feb. 15, 1941		Feb 14, 1942	Feb 15, 1941	
NEW ENG.												
Maine	0	0	0	31	7	25	0	0	0	0	0	0
New Hampshire	0	0	0	13	4	7	0	0	0	0	0	0
Vermont	0	0	0	6	14	14	0	0	0	0	0	0
Massachusetts	0	0	0	374	125	235	0	0	0	0	0	1
Rhode Island	0	1	0	8	8	11	0	0	0	0	0	0
Connecticut	2	0	0	48	48	97	0	0	0	0	0	0
MID ATL.												
New York	2	3	1	388	409	690	0	0	0	9	2	2
New Jersey	1	0	0	147	275	172	0	0	0	0	1	1
Pennsylvania	0	0	0	367	320	320	0	0	0	5	2	4
E NO CEN.												
Ohio	0	0	0	306	90	419	0	0	1	4	2	1
Indiana	0	0	0	160	179	188	0	1	2	2	3	3
Illinois	0	2	1	231	445	524	0	7	7	2	2	3
Michigan [2]	1	1	1	253	182	497	0	3	3	1	0	2
Wisconsin	1	2	0	208	115	206	0	4	4	3	0	0
W NO CEN.												
Minnesota	0	1	1	93	51	136	0	8	8	0	0	0
Iowa	0	1	1	49	75	161	1	1	33	0	0	1
Missouri	0	0	0	62	87	100	2	2	13	4	1	1
North Dakota	0	0	0	27	26	21	0	0	1	0	0	1
South Dakota	0	0	0	35	21	23	0	0	3	0	0	0
Nebraska	0	0	0	32	27	36	0	0	2	0	0	0
Kansas	0	2	0	98	79	179	0	6	6	0	1	1
SO ATL.												
Delaware	0	0	0	65	16	16	0	0	0	0	0	0
Maryland [2]	0	1	0	88	73	65	0	0	0	0	3	0
Dist of Col	0	0	0	12	7	17	0	0	0	1	0	0
Virginia	0	0	0	46	35	35	0	0	0	1	1	2
West Virginia	0	0	0	37	37	50	0	0	0	2	0	2
North Carolina	0	2	0	42	41	55	0	0	0	1	1	1
South Carolina	0	0	0	6	16	8	0	0	0	2	0	2
Georgia	0	2	0	27	21	18	0	0	0	28	4	3
Florida	0	1	1	17	7	10	0	0	0	5	2	2
E SO CEN.												
Kentucky	0	2	2	78	90	68	0	0	1	0	0	1
Tennessee	3	1	1	42	91	54	0	2	2	3	5	3
Alabama	1	0	1	24	14	16	0	0	0	0	0	1
Mississippi [2]	0	0	1	4	5	6	2	0	1	1	3	1
W SO CEN.												
Arkansas	0	2	1	6	27	15	1	0	1	2	1	1
Louisiana	1	0	0	4	11	10	0	0	0	4	1	5
Oklahoma	0	0	0	26	30	30	0	0	1	1	0	3
Texas	1	2	2	58	41	89	6	1	5	6	4	7
MOUNTAIN												
Montana	0	0	0	28	45	34	0	0	0	0	0	1
Idaho	0	0	0	2	14	14	0	0	1	0	0	0
Wyoming	0	0	0	20	8	9	0	1	1	0	0	0
Colorado	0	0	0	32	26	42	0	2	5	0	2	0
New Mexico	0	0	0	8	5	21	0	0	0	1	0	3
Arizona	0	0	0	14	5	5	0	0	0	0	0	0
Utah [2]	0	1	0	57	13	16	0	0	0	0	0	0
Nevada	0	0	---	0	0	-----	0	0	------	0	0	--
PACIFIC												
Washington	0	0	0	45	18	61	0	0	2	1	0	1
Oregon	0	0	0	11	17	20	0	0	2	0	0	1
California	3	3	2	92	142	171	1	0	11	4	2	4
Total	16	30	20	3,827	3,437	5,620	13	38	371	93	43	87
6 weeks	154	179	141	21,872	20,210	31,802	97	302	1,828	493	414	661

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended February 14, 1942—Con.

Division and State	Whooping cough, Week ended— Feb 14, 1942	Whooping cough, Week ended— Feb. 15, 1941	Week ended Feb 14, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	37	9	0	0	0	0	0	0	0	0	0
New Hampshire	28	3	0	0	0	0	0	0	0	0	0
Vermont	53	7	0	0	0	0	0	0	0	0	0
Massachusetts	220	244	0	0	1	0	0	0	0	0	0
Rhode Island	44	8	0	0	0	0	0	0	0	0	0
Connecticut	113	56	0	0	1	0	0	0	0	0	0
MID ATL											
New York	417	332	0	1	19	0	0	0	0	0	0
New Jersey	195	105	0	4	0	0	0	0	0	0	0
Pennsylvania	214	96	2	0	0	0	0	0	0	0	0
E. NO CEN.											
Ohio	240	158	0	0	1	0	1	0	0	1	0
Indiana	65	38	0	0	0	0	0	1	0	0	0
Illinois	158	106	0	0	0	0	1	0	0	3	0
Michigan [2]	192	254	0	0	0	0	0	0	0	0	0
Wisconsin	232	98	0	0	0	0	0	0	0	0	0
W NO CEN.											
Minnesota	53	43	0	1	0	0	0	0	0	0	0
Iowa	24	30	0	0	0	0	0	0	0	0	0
Missouri	28	28	0	0	0	0	0	0	0	0	0
North Dakota	13	7	0	0	0	0	0	0	0	1	0
South Dakota	11	19	0	0	0	0	0	0	0	0	0
Nebraska	17	4	0	0	0	0	0	0	0	0	0
Kansas	55	152	0	0	0	0	0	0	0	0	0
SO ATL.											
Delaware	1	17	0	0	0	0	0	0	0	0	0
Maryland [2]	53	102	0	0	0	1	1	0	0	0	0
Dist of Col	38	10	0	0	0	0	0	0	0	0	0
Virginia	70	148	0	0	0	14	0	0	0	1	0
West Virginia	41	34	0	0	0	0	0	0	0	0	0
North Carolina	148	271	0	0	0	0	0	0	0	0	3
South Carolina	45	78	0	0	0	0	0	0	0	1	3
Georgia	37	14	0	0	8	0	0	0	0	4	8
Florida	16	4	0	0	0	0	0	0	0	0	3
E SO CEN											
Kentucky	84	88	0	0	0	0	0	0	0	0	0
Tennessee	26	64	0	0	0	0	0	0	0	2	0
Alabama	37	25	0	0	0	0	0	0	0	1	8
Mississippi [2]	-	-	0	0	0	0	0	0	0	3	0
W SO CEN.											
Arkansas	11	8	0	3	0	0	0	0	0	0	0
Louisiana	3	3	0	0	0	0	1	1	0	1	1
Oklahoma	6	29	0	0	0	0	0	0	0	0	0
Texas	172	340	0	2	29	0	0	0	0	1	19
MOUNTAIN											
Montana	21	5	0	0	0	0	0	0	0	0	0
Idaho	11	9	0	0	0	0	0	0	0	0	0
Wyoming	3	2	0	0	0	0	0	0	0	0	0
Colorado	36	55	0	0	0	0	0	0	0	0	0
New Mexico	53	14	0	0	0	5	0	0	0	0	0
Arizona	56	33	0	0	0	0	0	0	0	0	0
Utah [2]	40	120	0	0	0	0	0	0	0	0	0
Nevada	8	6	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	111	73	0	0	0	0	0	0	0	0	0
Oregon	31	15	0	0	8	0	0	0	0	0	0
California	244	259	0	0	0	0	0	0	0	0	1
Total	3,811	3,623	2	11	67	20	4	2	0	19	46
6 weeks	25,512	25,887									

[1] New York City only
[2] Period ended earlier than Saturday
[3] Figures for Arkansas include delayed reports as follows Measles, 13, influenza, 3.

WEEKLY REPORTS FROM CITIES

City reports for week ended January 31, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	1	0	45	2	6	0	6	0	5	0	0	1
Baltimore, Md	1	0	3	2	170	4	18	0	22	0	1	30
Barre, Vt	0	0	------	0	0	0	0	0	0	0	0	0
Billings, Mont	0	0	-	0	0	0	2	0	0	0	0	0
Birmingham, Ala	3	1	91	1	1	0	5	0	0	0	0	3
Boise, Idaho	0	0	------	0	0	0	1	0	0	0	0	0
Boston, Mass	0	0	------	1	39	0	19	0	72	0		59
Bridgeport, Conn	0	0	------	0	1	1	2	0	5	0	0	1
Brunswick, Ga	0	0	------	0	70	0	0	0	0	0	0	0
Buffalo, N Y	0	0	------	0	3	0	6	0	27	0	0	8
Camden, N J	1	0	-	0	11	0	0	0	11	0	0	3
Charleston, S C	0	0	70	0	0	0	0	0	2	0	0	3
Charleston, W Va	0	0	1	0	1	0	0	0	0	0	0	0
Chicago, Ill	17	0	15	3	49	0	26	0	109	0	1	104
Cincinnati, Ohio	1	0	2	1	0	0	4	0	22	0	0	14
Cleveland, Ohio	0	0	13	1	7	0	8	0	40	0	1	33
Columbus, Ohio	0	0	1	1	12	0	2	0	10	0	1	10
Concord, N H	0	0		0	0	1	1	0	0	0	0	0
Cumberland, Md	0	0		0	5	0	1	0	2	0	1	0
Dallas, Tex	0	0	1	1	58	0	4	1	10	0	1	9
Denver, Colo	6	0	26	0	41	0	7	0	7	0	0	11
Detroit, Mich	4	0	7	0	44	0	9	0	158	0	1	76
Duluth, Minn	0	0		0	4	0	0	0	12	0	0	5
Fall River, Mass	1	0		0	0	0	0	0	36	0	0	1
Fargo, N Dak	0	0	------	0	0	0	0	0	0	0	0	1
Flint, Mich	0	0	------	0	0	0	1	0	1	0	0	9
Fort Wayne, Ind	0	0	------	0	3	0	2	0	1	0	0	0
Frederick, Md	0	0	------	0	7	0	1	0	1	0	0	0
Galveston, Tex	0	0	------	1	0	0	0	0	0	0	0	0
Grand Rapids, Mich	0	0	------	0	9	0	2	0	6	0	0	7
Great Falls, Mont	0	0	------	0	29	0	0	0	1	0	0	7
Hartford, Conn	0	0	------	0	8	0	0	0	4	0	0	12
Helena, Mont	0	0	------	0	0	0	0	0	1	0	0	1
Houston, Tex	5	0	------	0	4	0	8	0	4	0	3	2
Indianapolis, Ind	3	0	------	0	6	0	12	0	14	0	0	18
Kansas City, Mo	0	0	------	0	4	0	5	0	24	0	0	6
Kenosha, Wis	0	0	------	0	1	0	0	0	4	0	0	7
Little Rock, Ark	0	0	------	0	41	0	1	0	0	0	0	4
Los Angeles, Calif	2	0	35	2	104	1	20	0	32	0	0	9
Lynchburg, Va	0	0	------	0	0	0	2	0	0	0	0	2
Memphis, Tenn	1	0	20	1	6	0	4	0	6	0	0	7
Milwaukee, Wis	0	0	------	0	31	0	0	0	35	0	0	126
Minneapolis, Minn	1	0	------	1	32	0	6	0	17	0	0	13
Missoula, Mont	0	0	------	0	0	0	1	0	0	0	0	0
Mobile, Ala	0	0	1	0	9	0	1	0	0	0	0	0
Nashville, Tenn	1	0	------	0	1	0	5	0	4	0	0	0
Newark, N. J	0	0	9	0	29	0	10	0	30	0	0	24
New Haven, Conn	0	0	------	0	47	0	1	0	3	0	0	3
New Orleans, La	3	1	8	3	2	0	13	0	5	0	3	1
New York, N. Y	23	0	13	3	46	6	77	0	176	0	0	341
Omaha, Nebr	0	0	------	0	25	0	1	0	4	0	0	0
Philadelphia, Pa	2	0	3	3	19	0	36	0	132	0	1	45
Pittsburgh, Pa	1	0	4	5	8	2	17	0	12	0	0	12
Portland, Maine	0	0	------	0	8	0	3	0	7	0	0	5
Providence, R I	1	0	------	0	20	0	6	0	3	0	0	18

City reports for week ended January 31, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Pueblo, Colo	0	0		0	71	0	3	0	5	0	0	0
Racine, Wis	0	0		0	3	0	0	0	13	0	0	11
Raleigh, N C	0	0		0	14	0	2	0	4	0	0	3
Reading, Pa	0	0		1	3	0	3	0	0	0	0	2
Richmond, Va	1	0	1	1	2	0	4	0	3	0	0	0
Roanoke, Va	0	0		0	0	1	0	0	1	0	0	1
Rochester, N Y	0	0		0	24	1	3	0	4	0	1	12
Sacramento, Calif	1	0		0	125	0	3	0	3	0	0	9
St. Joseph, Mo	0	0		0	4	0	11	0	2	0	0	0
St. Louis, Mo	0	0	4	1	45	0	12	0	25	0	0	7
St. Paul, Minn	0	0		0	173	0	8	0	6	0	0	36
San Antonio, Tex	0	0	19	2	3	0	3	0	3	0	0	2
San Francisco, Calif	0	0	1	0	34	1	5	0	5	0	0	7
Savannah, Ga	0	0	38	1	59	0	1	0	3	0	0	3
Seattle, Wash	0	0		1	0	0	7	0	5	0	0	32
Shreveport, La	2	0		0	2	0	0	0	0	0	0	0
South Bend, Ind	1	0		0	0	0	0	0	12	0	0	2
Spokane, Wash	0	0		0	2	1	0	0	3	0	0	10
Springfield, Ill	0	0		0	3	0	2	0	2	0	0	0
Springfield, Mass	0	0		0	5	1	2	0	14	0	0	35
Superior, Wis	0	0		0	1	0	0	0	0	0	0	4
Syracuse, N Y	0	0		0	3	0	0	0	9	0	1	33
Tacoma, Wash	0	0		1	0	0	0	0	0	0	0	3
Tampa, Fla	0	0		0	1	0	1	0	0	0	0	1
Terre Haute, Ind	0	0		0	0	0	2	0	1	0	0	0
Topeka, Kans	0	0		0	10	0	1	0	5	0	0	7
Trenton, N J	0	0		0	1	1	0	0	3	0	0	7
Washington, D C	0	0	1	0	11	4	7	0	13	0	1	22
Wheeling, W Va	0	0		0	76	0	1	0	0	0	0	1
Wichita, Kans	0	1	1	0	0	0	6	0	7	0	0	4
Wilmington, Del	0	0		0	0	0	8	0	23	0	0	2
Wilmington, N C	0	0		0	162	0	2	0	0	0	0	4
Winston-Salem, N C	0	0	10	0	79	0	3	0	2	0	0	0
Worcester, Mass	0	0		0	3	0	5	0	37	0	0	26

Dysentery, amebic—Cases Chicago, 2, Los Angeles, 1
Dysentery, bacillary—Cases Los Angeles, 1, Rochester, 1; Syracuse, 13
Dysentery, Unspecified—Cases San Antonio, 1
Encephalitis, infectious—Cases Birmingham, 1, New Orleans, 1.
Tularemia—Cases Chicago, 2, Memphis, 2 New Orleans, 1
Typhus fever—Cases Houston, 1, Los Angeles, 1, New York, 1; Richmond, 1; Savannah, 2.

Rates (annual basis) per 100,000 population for a group of 89 selected cities (population, 1942, 33,979,708)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Jan 31, 1942	12 75	68 06	6 15	298 05	70 83	198 19	0 00	2.61	205 41
Average for week, 1937-41	21 09	374 80	24.19	538 56	134 91	231 21	5.43	2.46	176.00

TERRITORIES AND POSSESSIONS

HAWAII TERRITORY

Plague (rodent).—Twelve rats found during the period November 25 to December 22, 1941, in Paauhau, Hamakua District, Island of Hawaii, T. H., have been proved positive for plague.

VIRGIN ISLANDS OF THE UNITED STATES

Notifiable diseases—October–December 1941.—During the months of October, November, and December, 1941, cases of certain notifiable diseases were reported in the Virgin Islands of the United States as follows:

Disease	October	November	December	Disease	October	November	December
Chickenpox	-	-	1	Malaria	1	2	2
Dengue	54	12	6	Schistosomiasis	-	-	1
Dysentary (amebic)	---	1	---	Sprue		1	---
Filariasis	6	12	10	Syphilis	55	31	30
Gonorrhea	15	26	25	Tuberculosis	5	1	1
Hookworm disease	2	3	6	Vincent's infection	------	1	-------

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended January 17, 1942.—During the week ended January 17, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		3		1	5	79		1		89
Chickenpox		33	1	179	455		47	27	116	858
Diphtheria		24		13	4	3	1		1	46
Encephalomyelitis							1			1
German measles	3	2		6	20	16	9	10	23	98
Influenza		19			2	8			62	91
Measles		1	2	290	115	75	43	13	46	585
Mumps		7	2	340	334	86	185	18	248	1,220
Pneumonia		7			24	2			7	40
Poliomyelitis			1							1
Scarlet fever		24	7	171	248	23	21	36	20	550
Trachoma									1	1
Tuberculosis	5	2	7	53	42			1		110
Typhoid and paratyphoid fever			2	12	2				1	17
Undulant fever					1					1
Whooping cough		36	9	159	102	2	2	2	27	339
Other communicable diseases		2		5	222	5	5		1	240

JAMAICA

Communicable diseases—4 weeks ended January 17, 1942.—During the 4 weeks ended January 17, 1942, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	2	3	Puerperal sepsis		2
Diphtheria	2	6	Tuberculosis	15	68
Erysipelas		1	Typhoid fever	7	42
Poliomyelitis		1	Typhus fever		1

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-named diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

Plague

Morocco—Correction.—The total number of cases of plague in Morocco for the period January to October 1941, shown on page 183 of the PUBLIC HEALTH REPORTS of January 30, 1942, should have been 2,117 instead of 2,127 as reported. For the same period only 1 case of plague was reported in Casablanca, Morocco, instead of 4 cases as shown.

Peru.—During the month of December 1941, plague was reported in Peru by Departments as follows: Libertad, 1 case, 1 death; Lima, 7 cases, 5 deaths; Piura, 1 case.

Smallpox

Tunisia—Tunis.—During the week ended December 20, 1941, 1 case of smallpox was reported in Tunis, Tunisia.

Typhus Fever

Algeria.—During the period January 1–10, 1942, 1,004 cases of typhus fever were reported in Algeria. During the month of December 1941, 2,077 cases were reported.

Spain.—For the week ended January 10, 1942, 173 cases of typhus fever were reported in Spain, and for the week ended January 3, 1942, 135 cases were reported.

Yellow Fever

Sudan (French)—Kouremale.—On January 31, 1942, 1 death from suspected yellow fever was reported in Kouremale, French Sudan.

COURT DECISION ON PUBLIC HEALTH

Records of county health commissioner concerning typhoid carrier held not privileged.—(New York Court of Appeals; *Thomas* v. *Morris et al.*, 36 N.E.2d 141; decided July 29, 1941.) An action was brought by the plaintiff, as administrator, for damages for the death of a person from typhoid fever. It was alleged that the fatal bacillus was transmitted to the decedent by reason of the negligent conduct of the defendant who, it was charged, prepared and handled food served to the decedent, a guest at defendant's hotel, notwithstanding that the defendant was, to her own knowledge, a typhoid carrier. The plaintiff sought an order requiring a county health commissioner and the

State department of health each to produce at the trial such records and papers as might indicate whether or not the defendant was a typhoid carrier and, if so, might show what, if any, knowledge the defendant had of such condition and what, if any, information was furnished her by the county or State health departments to the effect that she could transmit the disease to others. The State was willing to produce its records but the county health commissioner opposed the plaintiff's motion and, when the trial court granted an order for the issuance of a subpena duces tecum, appealed to the appellate division of the supreme court. The appellate division reversed the trial court's order, holding that the records were privileged under section 352 of the civil practice act and that the county health commissioner could not be required to bring them into court. The case was carried to the New York Court of Appeals which took the view that the order of the trial court was correct and that the records kept by the county health commissioner in the course of his official duties could be made available to the plaintiff.

"We decide," said the court, "that no privilege attaches to these records and that the public policy of the State as expressed in the public health law (Consol. Laws, ch. 45) and the State sanitary code, confers no such privilege." Privilege was stated not to exist unless conferred by some statute and that here the statutes pointed the other way and seemed to require that such records, insofar as they referred to known or suspected typhoid carriers, be made available in a case like the instant one. The sanitary code, which had the force of law, required local health officers to keep the State health department informed regarding the names, ages, and addresses of known or suspected typhoid carriers, to furnish to the department necessary specimens for laboratory examination, to inform the carrier and members of his household of the situation, and to exercise certain controls over the activities of the carriers, including a prohibition against any handling by a carrier of food which was to be consumed by persons other than members of his own household. Answering its own question of why should the record of compliance by the county health officer with these salutary requirements be kept confidential, the court said that, hidden in the files of the health office, it served no public purpose except a bare statistical one, but that, made available to those with a legitimate ground for inquiry, it was effective to check the spread of the disease. "It would be worse than useless to keep secret an order by a public officer that a certain typhoid carrier must not handle foods which are to be served to the public."

Section 352 of the civil practice act was held not to control in the instant case, the court saying that the information, if any, in the health commissioner's files concerning the defendant was not acquired by the

commissioner "in attending a patient in a professional capacity" nor was the information "necessary to enable him to act in that capacity." Although the information may have come to the commissioner from a physician in private practice, the transmittal from the physician to the commissioner was in obedience to the express command of law. Also, the court was of the view that an intention that the communicable disease records should not be kept confidential was found in the history of such law. Since 1909, said the court, the law had provided that reports as to tuberculosis should not be divulged or made public. In 1939 an amendment named three other diseases, not including typhoid fever, as to which reports should be kept secret. "It seems to follow that similar reports as to other communicable diseases are not so privileged."

COURT DECISION ON PUBLIC HEALTH

Use of paper containers in the sale of milk.—(United States Circuit Court of Appeals, Seventh Circuit; *Fieldcrest Dairies, Inc.*, v. *City of Chicago, et al.*, 122 F.2d 132; decided August 4, 1941.) In January 1935, the city of Chicago adopted an ordinance regulating the production and distribution of milk in the city. One of the provisions of this ordinance read: "Any milk or milk products sold in quantities of less than one gallon shall be delivered in standard milk bottles; provided, however, that nothing herein contained shall be construed to prohibit hotels, soda fountains, restaurants, and similar establishments from dispensing milk or milk products from sanitary dispensers approved by the board of health" The plaintiff corporation sought a judicial declaration that the above-quoted requirement that milk be delivered in "standard milk bottles" did not prohibit the sale of milk in the plaintiff's paper containers or that, if it did, the provision of the ordinance was invalid. Also, an injunction was sought restraining the defendants from interfering with the sale of milk in such paper containers.

The court of appeals concluded that the use of the plaintiff's paper containers for the delivery of milk in the city was prohibited by the ordinance, taking the view that what the city council meant and intended by standard milk bottle was the glass bottle in universal use at the time of the adoption of the ordinance. The language of the ordinance had to be construed as it was intended to be understood when the ordinance was passed, and the court pointed out that the use of paper containers was scarcely known when the ordinance was enacted.

In connection with the attack made upon the validity of the ordinance, the court proceeded to consider the legislation enacted by the Illinois Legislature in July 1939, during the pendency of the instant suit. By this lengthy statute, as well as by the regulations

promulgated pursuant thereto, the State undertook to regulate the pasteurization of milk and the sale and distribution thereof, and, according to the court, it was plain that the use of single service containers, such as those of the plaintiff, for the distribution of milk was permitted and approved upon compliance with the act. "Thus," said the court, "we are confronted with a situation wherein the State on the one hand has expressly recognized and made provision for the use of a single service container for the sale and distribution of milk upon compliance with the requirements of the act, and regulations lawfully promulgated in conformity therewith, and on the other hand, with the provision of the city ordinance which prohibits such use." The conclusion was reached that the portion of the ordinance prohibiting the plaintiff from distributing milk in single service containers was contrary to the public policy of the State and void. The court said, however, that it had no doubt that the city, by virtue of a saving clause contained in the statute, had the power to regulate paper containers and held that the plaintiff was entitled to an injunction restraining the defendants from prohibiting, but not from regulating, the use of such containers.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E R COFFEY, *Assistant Surgeon General Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague smallpox typhus fever, yellow fever, and other important communicable diseases throughout the world, (2) articles relating to the cause, prevention, and control of disease, (3) other pertinent information regarding sanitation and the conservation of the public health

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Public Health Reports

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AN APPRAISAL TECHNIQUE FOR URBAN PROBLEM AREAS AS A BASIS FOR HOUSING POLICY OF LOCAL GOVERNMENTS [1]

Illustrative Results from Three Test Surveys

Report of the SUBCOMMITTEE ON APPRAISAL OF RESIDENTIAL AREAS, *Committee on the Hygiene of Housing, American Public Health Association*

I. THE METHOD OF APPRAISAL

The committee's approach.—Objective appraisal of over-all housing characteristics of substandard areas in terms of their essential healthfulness is becoming increasingly important with the expanding interest of health departments in housing and with the widespread feeling that housing must take a significant place in post-war planning.

The first task undertaken by the Committee on the Hygiene of Housing was the establishment of a series of "Basic Principles of Healthful Housing." [2] Since the publication of that document there have been many requests from public health officials that the committee translate the substance of these principles into a yardstick for the measurement of housing conditions in order that local programs of inspection and enforcement might be better guided. The development of a technique to accomplish this has been the work of this subcommittee.[3] It is recognized that such a technique could be employed by local health departments or other local agencies, depending upon their precise needs, sometimes on a sampling basis, sometimes for a whole substandard area. In working out the technique, the subcommittee has taken care at all times to keep it flexible enough to meet the varying needs which will arise, but still to keep

[1] Presented at Thirteenth Meeting of Committee on the Hygiene of Housing, Washington, D C , February 2, 1942. Prepared by Allan A Twichell and Anatole Solow. Members of the subcommittee are: Frederick J Adams, F. Stuart Chapin, Earle S Draper, Andrée Emery, George C Ruhland, Rollo H. Britten, chairman, Allan A Twichell, secretary, and Anatole Solow, research associate

The concluding sections of this report to be published in an early issue of the PUBLIC HEALTH REPORTS, will carry further the analysis of these three test surveys to illustrate the specific actions and types of administrative policy which may naturally develop from the application of this technique.

[2] Basic Principles of Healthful Housing, Am J Pub Health, 28: 351–372 (1938). Second edition issued in 1939 and reprinted as appendix to the committee's "Housing for Health" (1941) Reprints available from the committee, 310 Cedar Street. New Haven, Conn , at 25 cents per copy.

[3] The present subcommittee was preceded by the Subcommittee on Housing Survey Procedures, under the chairmanship of Dr. George C. Ruhland, health officer of the District of Columbia.

to the fundamental purpose of an objective appraisal of the quality of housing in substandard areas.

It was believed that a technique developed with these objectives in mind would lead to the abandonment of the common practice of permitting sporadic complaints to guide the housing inspection service of health departments and would promote a method of systematic inspection and enforcement with respect to specific housing problem areas [4]

Determination of substandard areas may be thought of from two points of view First, there is the broad outlining, through city-wide surveys, of areas in which unsatisfactory housing conditions may be expected Such delimitation, it is felt, should be available through real property inventories, the 1940 housing census, or later surveys utilizing the housing census schedule After careful consideration of such procedures, the subcommittee came to the conclusion that it would be unnecessary to develop a new schedule for a city-wide survey The second point of view is that of the determination of the relative quality of specific blocks of sections lying within an area generally substandard Such determination requires a more intensive type of survey, which, however, must still be kept within practicable limits

A shortcoming of the city-wide housing surveys just mentioned lies in the fact that the collected data do not readily lend themselves to a variety of purposes for local government agencies concerned with housing In the development of its new technique, therefore, the subcommittee has put particular emphasis on developing a method of data analysis whereby final results could be readily summarized and interpreted by local health departments and various other agencies as a guide for their policy and practice with regard to areas presenting housing problems

The subcommittee considers that a survey technique designed for this more intensive coverage should provide the following

Reasonably thorough indication of the housing conditions which may significantly affect physical or mental health with clear separation of the relatively fixed physical conditions of the structure and the changeable factors of occupancy and maintenance, and with recognition of the neighborhood environment as an integral part of the problem

Objective description of these conditions in terms of facilities and characteristics which can be reliably observed by different enumerators with a minimum of difference due to subjective judgment

Schedules and procedures which can be effectively used by the regular personnel of health departments and other local agencies

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[4] An example of the use of such systematic inspection service is the experience of Memphis, Tenn See Graves L M and Fletcher Alfred H Enforcement and Subsidy in the Control of Slums, in 'Housing for Health Committee on the Hygiene of Housing (1941), pp 18-36

A reasonable scoring method for presentation of summary findings and for over-all comparison of conditions from structure to structure, district to district, or perhaps from city to city.

Selection of appraisal items.—Although the subcommittee's criteria for the selection of items to be appraised follow as closely as possible the "Basic Principles of Healthful Housing," [5] it would be difficult in a survey of this character to ascertain the exact extent of conformity to all these principles. The information for many of the items could not be obtained without professional personnel, elaborate equipment, and extended observation. Furthermore, so many items would have to be covered that the survey would lose its practical value.

The solution has seemed to be in a screening method by means of index facts, i. e., in the determination of a limited number of factors which may be taken to represent the whole complex of housing conditions. The point is of first importance since one of the most difficult aspects of a survey procedure is to determine the amount of detailed information both necessary and practicable. For instance, the presence of an inside flush toilet not shared by other households is determined and scored not only because of an interest in whether such a facility is present, but because of its assumed intrinsic meaning as one element in an index of hygienic housing. Similarly it appears from studies of the development of residential areas that undesirable housing conditions tend to coincide with heterogeneous, unplanned land uses. Thus the intermixture of industrial and commercial uses with residences is ascertained both because industrial nuisances may affect the inhabitants and because land-use distribution is known to reflect the general character of the area.

The selection of index facts to be included offers numerous difficulties, not the least of which is the objectivity of the items, in other words, the extent to which identical information can be obtained by different enumerators. With this criterion in mind, items are included only where quantitative values can be set up or discrete lines drawn by exact definition.

In treating items which appear in the schedules of the real property inventories and Federal housing census, the subcommittee recognized the importance of maintaining comparability. In view of the purpose of this technique, however, it was necessary to develop new items and special emphases.

In each dwelling unit both family composition and room dimensions are obtained. This permits the computation of overcrowding on three bases: gross area per person, net living (nonsleeping) area per person, and the number of persons per room—the measure commonly

[5] See footnote 2.

used in housing surveys. The use of health department inspectors for the enumeration is particularly effective in connection with items of this type, for such inspectors are able to gain entry into all parts of the dwelling.

Special objective measures have been developed by the subcommittee for two important factors which have been unsatisfactorily dealt with, or omitted, in most other housing surveys: structural deterioration, and the crowding together of buildings, which seriously impairs the quality of daylight in so many congested areas. Emphasis has been put on the character of public halls and on services provided in multiple dwellings by the landlord. Sanitary and heating facilities are considered in some detail, as are housekeeping facilities, including kitchen equipment and closets.

A clear distinction is made between those items which are of a descriptive nature and are used for classification purposes, such as type of building, income, rent, or size of family, and those condition items which determine the quality of housing and which are used for rating.

The environmental part of the technique, in addition to its use in appraising individual dwellings and structures, is being developed for the use of police-power agencies, as a guide for site selection by housing authorities, for the appraisal of rehabilitation schemes, and for other planning purposes. This approach considers the intermixture of residential and nonresidential uses, specific industrial nuisances, the density of land coverage, the usability of open spaces, the availability of public utilities and other community facilities such as schools and playgrounds, and finally specific hazards: exposure to heavy traffic, liability to flooding, noxious odors, and the like.

It is of course recognized that some neighborhood characteristics will vary as to their influences on dwellings within an area and can be only roughly appraised, and that for some factors new measures must be developed.

Data collection.—The technique involves three field schedules: one for the dwelling unit, one for the structure as a whole, and a third for the block and neighborhood. The dwelling unit and structure schedules have been developed to a final form and have been tested in three New England cities.[6] The block or environmental schedule, which is being developed in cooperation with the City Planning Department of Massachusetts Institute of Technology, is in the experimental stage. The dwelling and structure schedules have been designed for enumeration by inspectors of local health departments or nonprofessional persons after brief intensive training, and the tests in New England have demonstrated the feasibility of this

[6] The field schedules for the dwelling unit and the structure will be reproduced in a later section of this report.

procedure. However, the environmental appraisal requires the active participation of a sanitary or planning engineer.

The scoring method.— The system of scoring has been developed as a series of penalty ratings which seek to measure the departure of any condition from a standard of acceptability derived by the subcommittee from the Basic Principles. While weights have been only tentatively assigned to individual deficiency items, the results of several test surveys illustrated in the next section have convinced the subcommittee that the summation of such individual penalties can be made to give a reliable picture of the over-all quality of housing.

Basic deficiencies, any one of which may make a dwelling substandard—such as the absence of private toilet —are separately recorded as a supplement to the over-all penalty score. Scoring is done in the office rather than in the field, for it is believed that the enumerator should report conditions only and should not complicate either his work or his attitudes by the assignment of ratings. Separate subscores are computed for the physical condition of the dwelling and for its occupancy characteristics. The rating form has been developed quite separately from the schedule, in order to facilitate changes in weighting in the light of cumulative experience or in the light of conditions which may vary from region to region

II. ILLUSTRATIVE RESULTS FROM THREE TEST SURVEYS

Purpose and nature of the studies.—In the development of its procedure the subcommittee has made three test surveys, in order to check on the applicability of the technique to various types of urban problem areas, to test the feasibility of its execution with nontechnical personnel, to develop a method of scoring, and to test in a preliminary way the probable utility of the results in shaping the policy of local government bureaus concerned with housing.

Problem areas of three types have been surveyed, one each in New Haven, Waterbury, and Stamford, Conn. In one of these cities 12 blocks of a well-known slum district were surveyed with the earliest version of the schedules, and for one representative block (131 dwelling units) the data were subsequently brought into form comparable with material obtained from later schedules used in the other 2 tests.[7] In another city the entire central district of mixed residence and business, comprising 18 blocks and 849 dwelling units, was analyzed. In the third case the study covered a random sample of 100 dwelling units, selected from all the low-rent districts of the city. The purpose here is not to characterize the housing in any of these cities, but

[7] Since these studies were carried out at different stages in the development of the subcommittee's work, certain minor variations have occurred in the schedules used from one to another of these cities While the variations would prevent comparison of the results for some minor details of the procedure, they do not affect the comparability of results for major characteristics which will be considered here.

to illustrate the range of problems which may arise in areas of different types in any city or group of cities. In fact for the purpose of this report these test surveys might be viewed as though they had set out to appraise problem areas of the same city, on a graded scale running from the center of its worst slum through a larger district generally considered substandard, and then to the entire low-rent, though not necessarily substandard or even blighted, districts of the city.

All the studies were carried out in cooperation with the local health departments, and the field work was done almost altogether by regular sanitary inspectors. In one case the survey was undertaken at the request of the local housing authority, which used part of the findings in planning its slum clearance program. One survey was cosponsored by the new housing division of the Connecticut State Department of Health.

Character of areas surveyed—The survey areas may be further characterized as follows:

Survey area I Slum block (131 dwelling units).

This consisted of one block in the heart of a district generally recognized to be one of the worst slums in the city One frontage of the block abuts on a heavy commercial traffic artery connecting the downtown business district with the industrial section, and was characterized by intermixture of tenements with shops stores, liquor establishments, and other commercial uses, 25 percent of all residential structures were also used for nonresidential purposes

Sixty percent of the buildings were three-or-more-family structures, 25 percent two-family and only 15 percent one-family structures The median dwelling unit rental was $14 monthly, and the median rent per room was $3 30 The reported median income of the families living in this block was between $750 and $1,000 per year

A previously conducted ecological survey of the city characterized the population of the district including survey area I as being predominantly foreign born, and consisting of laborers and artisans with very high delinquency and dependency rates

Survey area II Central substandard area (849 dwelling units).

This comprises the central district of a city of between 50,000 and 75,000 inhabitants The neighborhood surveyed lies between a heavily traveled mainline railroad and the principal downtown business street This area was considered by local officials to be generally blighted and substandard—a condition not infrequently found in similarly located areas of other cities

Although no detailed environmental survey of this district has yet been conducted, it may be said that the area as a whole shows generally undesirable characteristics for residential use, such as heavy truck traffic, lack of playgrounds or other open space, and several minor obnoxious industries Approximately half of the area is nonresidential, and only in a few places are there homogeneous residential clusters of any size Thirty percent of the buildings surveyed contained business on the first floor in addition to dwellings Of all buildings containing residences, 49 percent are three-or-more-family, 36 percent are two-family, and 15 percent one-family structures

The median dwelling unit rental was $20 a month at the time of survey, and the median monthly rent per room $5.75 Satisfactory income data were not

obtainable throughout the area. Negroes comprise more than one-third the population.

Survey area III: Entire low-rent district—Random sample (100 dwelling units).

No pattern can be traced here as to neighborhood environment or social structure, because of the diffusion of the 100 sample dwelling units among various low-rent sections of the city, including both purely residential and highly commercial districts.

Seventy percent of the structures containing these units were of the three-or-more-family type, and 33 percent of structures were used for mixed business and residential purposes. Rent and income figures were not obtained on the schedules used for this test.

Character of housing as shown by individual deficiencies.—Figure 1 shows at a glance the gradation of conditions, from one of these areas to the next, which would be expected.

The slum block has a very high incidence of several basic physical deficiencies. The reported need of major structural repairs in over

SALIENT HOUSING CHARACTERISTICS OF THREE PROBLEM AREAS

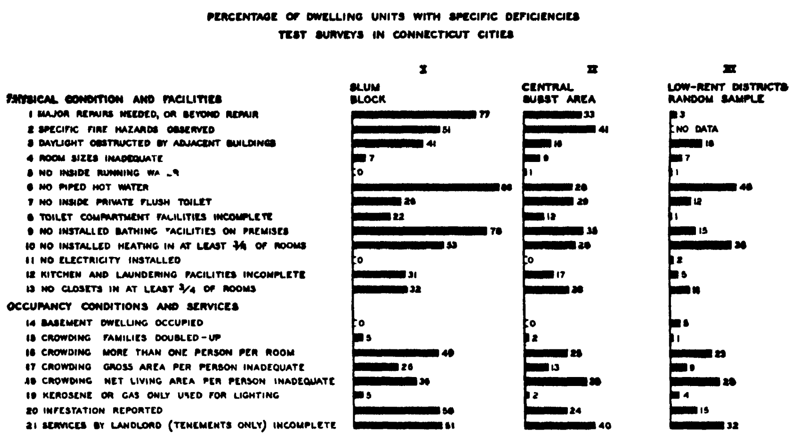

FIGURE 1.

three-quarters of the dwelling units, dependence on primitive heating facilities in over half of them, a high incidence of fire hazards as determined by the local fire department, and considerable daylight obstruction suggest a combination of physical conditions which could hardly be dealt with under any economically feasible scheme of rehabilitation. Toilets are shared with other units or are located outside the dwelling unit in 28 percent of the cases.* This fact, combined with the lack of installed bathing facilities on the premises for 78 percent of the dwelling units, clearly suggests a condition which could not be brought into compliance with accepted standards short of renovation so thoroughgoing as to be out of scale with the generally indicated quality of these buildings.

With respect to occupancy conditions in area I, from one-fourth to one-half of the dwelling units show more or less serious conditions with respect to each of three crowding indices: number of persons per room, gross area per person, and net living area per person. A high incidence of reported infestation, especially by rats, is to be expected in structures so generally deteriorated as these, and a figure of 50 percent for this item is not surprising. These two factors of disrepair and infestation alone might almost serve to indicate the hopelessness of salvaging these dwellings. The low-grade character of housing in this area is reflected by the 51 percent of dwelling units located in tenement structures for which the services by landlords are incomplete (two or more of the following services not regularly supplied: lighting of public halls, janitor service for public halls, and removal of garbage and refuse from the dwelling unit).

With no further analysis than is given in figure 1, we have a sketch portrait of the slum block, suggesting conditions beyond any real cure except complete clearance. It is obvious that no such drastic action will be taken by any official agency without further knowledge of the area, including the distribution of deficiencies among various types of families and dwellings. But perhaps it will be of interest to record that in the case of this particular block, the local housing authority upon further study did find demolition justified and promptly carried it out.

Whether conditions that warrant demolition or compulsory vacating will be found in districts with milder deficiencies is perhaps the next question. The data for the central district covered by survey II should give the measure of such a lesser problem area. These findings are undoubtedly more or less typical of the results which will be obtained in blighted areas or partial slums, the treatment of which may involve action considerably short of complete slum clearance. A considerable degree of substandardness and generally primitive character of the buildings are indicated by the percentage of dwellings which show reported need of major repairs, presence of specific fire hazards, and lack of private toilet or bathing facilities; and also by general shortage of built-in closets or adequate kitchen equipment. While two of the indices of crowding show a marked difference in favor of area II in comparison with area I, there is no difference in the case of the third index (net living area per person), and there is some indication that use-crowding of the nonsleeping rooms might be further studied in the substandard area. Serious infestation persists even in this somewhat better district, and a low grade of landlord services is found in only one-fifth less of the dwellings than in survey I.

Further breakdowns of the data from survey II have shown that while no deficiency here has a gross incidence (for these dwellings

considered as a whole) above 41 percent, several defects appear so serious, when cross-tabulated for family sizes, rental ranges, types of structure, etc., as to call for vigorous official action on specific problems.[8]

As for the low-rent dwelling sample covered by survey III, major deficiencies are so much less general than in areas I and II as to suggest at first glance that there is little here to concern the health department, the housing authority, or the welfare commission. However, some problem of obsolescence if not of substandardness is suggested by the high figures for lack of piped hot water and lack of installed heating facilities. A relatively low grade of multiple dwelling structures in this area too is indicated by 32 percent of the units in tenements with incomplete landlord services. Daylight-crowding, one of the basic faults of most New England tenement districts (and of those in many other portions of the country as well), persists in this best of the three survey areas, with 18 percent of the dwelling units located in structures which suffer moderate to serious daylight obstruction by their neighbors.

Inasmuch as the irremediable types of deficiency occur rather infrequently in the low-rent area, it would appear that this area includes a large proportion of dwellings capable of physical rehabilitation.

Perhaps the most striking difference between survey III and the others is in the figures for need of major repair (3 percent as compared with 77 percent and 33 percent). On the basis of a later recheck we know that the low figure cannot be taken as an indication that the structural conditions in area III are so much better. It is rather a demonstration of inadequacy in the common survey methods for determining condition of repair. Our early method of designating structural condition (used to collect the data plotted here for all three surveys) was taken over bodily from the housing survey technique of the Real Property Inventory. Under this method the enumerator subjectively assigns each structure to one of four categories: "good condition," "minor repairs needed," "major repairs needed," and "unfit for use." Our experience with this method, like that of many others, has been most unsatisfactory.[9]

The occupancy data from area III, the low-rent sample, deserve some comment. Here we encounter for the first time the occupancy of basement dwelling units, which can generally be expected to involve serious impediments to decent living. A figure of 5 percent for this item may look innocuous, but basement dwellings, if found in this

[8] The implications of this technique for policy and immediate action of local government bureaus will be explored in some detail in a later section of this report

[9] A new method for objective measurement of structural deterioration has since been developed by the subcommittee and will be treated in a later section of this report.

proportion throughout the low-rent area, would total some 300 cases. This by itself is a problem which might occupy the energies of the health and building department staffs for some time if the necessary inspection of basement living conditions were made and followed up with appropriate action under the legal powers now vested in these departments. The figures for items 16 and 18 of figure 1 suggest that additional occupancy problems warranting examination exist for at least one-fourth of the families in the low-rent area.

Summary appraisal by over-all penalty scores.—While the foregoing type of analysis of housing defects, in terms of individual deficiencies, is believed useful to give a first picture of the character and intensity of the housing problem in a particular area, it fails to provide the summary measures of the problem needed for discriminating policy. The data underlying figure 1, even when elaborately cross-tabulated, still fail to disclose readily those dwellings, structures, or groups of structures which contain the worst combinations of conditions. It is for this purpose that the subcommittee has developed its scheme of deficiency ratings or penalty scores. As previously noted, the scoring system assigns graded penalties to each dwelling unit (with its containing structure) based on the presence or degree of physical deficiencies or occupancy conditions represented in figure 1.

The illustrative results of the scoring system are shown in figure 2, which gives for the three survey areas the distribution of dwelling units by their total deficiency scores for (*a*) physical condition, (*b*) occupancy conditions, and (*c*) these two combined.

Recalling that the slum block was officially found to be in need of clearance, the scoring system may be interpreted first in terms of its results for that area. In survey I, the median penalty score for physical condition of the dwelling unit with its containing structure was 71 points. In another district of the same city, however, the median physical penalty score in a block which was surveyed under this technique but not included in the three test surveys previously discussed was 53 points. Since this block was subsequently demolished by the housing authority under its own slum-clearance program, it may be suggested, for purposes of interpreting figure 2, that groups of dwellings which are characterized by median physical penalties of 50 points or more (on the present provisional scale) are either in, or suspiciously close to, that class of housing which cannot be rehabilitated.

This is too simple a statement of the case, but it will help in visualizing the significance of the illustrative scoring data. That this concept is not too unrealistic is evident from the fact that under the provisional rating scheme a dwelling seldom incurs a physical penalty score as great as 50 points unless it combines several of the basic deficiencies, such as extreme structural deterioration, virtually complete lack of

sanitary and housekeeping facilities, fire hazard, or extreme daylight crowding. On the other hand, because of the construction of the scale, total physical condition penalties of less than 10 points must represent insignificant or mild deficiencies, at least from the viewpoint of official action under the police power.

In figure 2 the distribution of dwellings by total penalty scores (physical and occupancy conditions combined) in the right-hand columns will clarify our picture of how the problem is graded from the slum block to the low-rent district. These three areas have median total scores of 86 56, and 34 points, respectively, and show marked differences in distribution of dwellings by penalty values. Area II,

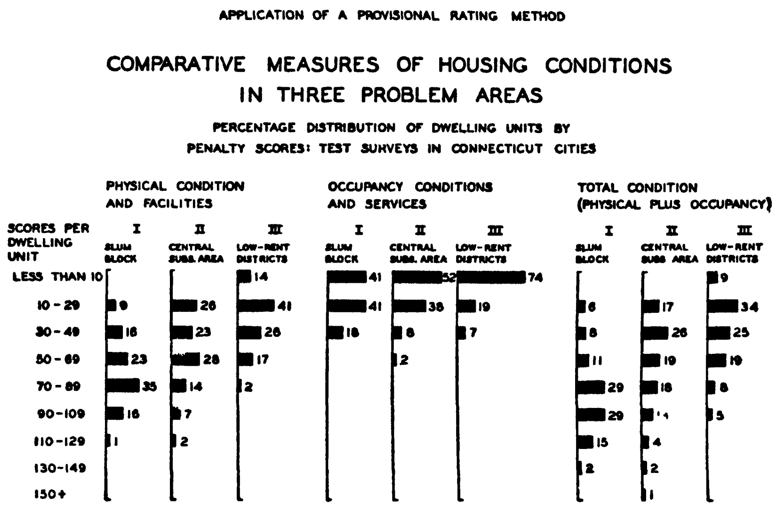

FIGURE 2

though much better generally than area I, contains some dwellings with total penalties as high as any found in the latter area.[10]

A much better understanding is gained, however, by considering the physical and occupancy components of these total scores. In area I the median physical penalty score is 71 points, and 75 percent of the dwelling units show penalties of 50 points or more--suggested above as a possible rough dividing line beyond which slum clearance may often be necessary. In the central substandard area half the dwellings show physical penalty scores above this level, while the random sample of the entire low-rent area contains about one-fifth of dwellings in this category—an indication that even here there is a sizable job of follow-up for the health department and housing authority.

The scale of penalties for occupancy conditions is short, since few significant objective indices have been found which are eligible for

[10] Unavoidable exigencies made it necessary to process some of the scoring data for the substandard area on a one-sixth random sample basis

rating. Occupancy penalties for a dwelling unit therefore seldom run above 50 points. As a rough guide to interpretation of the graphs, it may be said that an occupancy penalty score above 10 points with the present scale is reasonable evidence of undesirable occupancy conditions, though not necessarily of definite overcrowding. Scores above 20 points, however, will generally be incurred only where families are seriously crowded in one or more of the four ways indicated in figure 1.

For the slum block, a presumption of substandard conditions on the occupancy side is shown by scores of more than 10 points for 59 percent of the dwelling units, while the substandard area shows 48 percent. Occupancy scores above 20 points are found in 30 percent of area I and 18 percent of area II. It may be expected that in any follow-up a significant proportion of the families living under these conditions will be found in need of overcrowding abatement.

In illustrating the results obtained from the three test surveys, two points of view have been brought out: (*a*) the importance of dealing with the character of individual deficiencies of dwelling units in the areas, and (*b*) the importance of an over-all penalty score to represent conditions of dwellings as a whole. The tests indicate the definite practicability of this technique in determining, with a minimum of tabulation, the character of substandard housing areas.

PATHOLOGIC HISTOLOGY IN GUINEA PIGS FOLLOWING INTRAPERITONEAL INOCULATION WITH THE VIRUS OF "Q" FEVER [1]

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The purpose of this paper is to describe the pathologic changes encountered in guinea pigs after intraperitoneal inoculation with the virus of "Q" fever. Three strains were utilized, the original "Q" strain obtained from Burnet (*1*), Dyer's X strain (*2*), and the M strain isolated from the fatal human case described in previous reports (*3*, *4*). Animals were killed as follows: 4 X, 4 M, and 2 Q strain animals on the first, third, fifth, seventh, ninth, and eleventh days from onset of fever, 2 X and 2 M strain animals on the thirteenth day, and 4 X strain animals on the fifteenth, twentieth, and twenty-fifth days, making a total of 76 guinea pigs. In the X and M strain animals, the brain, part of the spinal column, and the entire thoracic and abdominal viscera en bloc were removed and fixed in Orth's fluid. With the "Q" strain, only heart, lung, liver, spleen, kidney, adrenal, and testicle were routinely taken.

The *heart* nearly always showed at least a few focal lesions. These became more numerous and more marked after the fifth day.

[1] From the Division of Pathology, National Institute of Health.

The most frequent lesion was lymphocyte infiltration interstitially, beneath the endocardium and diffusely and around vessels in the epicardium. Sometimes this was accompanied by or mixed with a focal proliferation of fibroblasts, particularly beneath the endocardium and around and in the papillary muscles. Vascular endothelial proliferation was relatively infrequent and usually occurred early in the disease. Rarely clusters of coccoid and bacilliform rickettsiae were found in endothelial cells, chiefly on the first day of fever. The epicardial reaction was most marked in the atrioventricular sulcus. Here, in addition to lymphocyte infiltration, there were sometimes serous exudate, fibrin, or plasma cells.

Three small granulomata of fusiform epithelioid cells with a little central nuclear debris and peripheral lymphocyte infiltration were found in 2 guinea pigs killed on the ninth day and one on the eleventh day from onset of fever. All 3 were infected with the X strain.

Focal lesions were perhaps less pronounced with the Q strain than with the M or X strains. With the X strain, they persisted to 25 days after onset, showing some apparent diminution in extent from the sixteenth day on.

Lungs.—Purulent pneumonias with organization, abscesses, gangrene and bronchiectases, such as are commonly encountered in guinea pigs, appeared in 4 of the 76 animals. Twenty-one of the remainder showed only con estion or focal perivascular lymphocyte infiltration or no lesions whatever. As the congestion may be assignable to ether anesthesia and as focal perivascular lymphocyte inf ltration is a quite frequent finding in guinea pigs, these animals are to be regarded as substantially without pulmonary reaction to the virus of "Q" fever. In 4 more, alveolar hemorrhages were the only other findings. As these are common in sudden death in rodents, they also must be disregarded.

In the remaining 47 animals, 13 inoculated with the M strain, 24 with the X strain, and 10 with the Q strain, there was a vaguely nodular, often peribronchial exudative process characterized by slight septal thickening and alveolar narrowing, and a loose alveolar exudate composed in some alveoli of polymorphonuclear leucocytes alone, in others often adjacent alveoli of red corpuscles, monocytes or coherent clumps of fusiform epithelioid cells, in others of various mixtures of the foregoing. Swollen attached alveolar epithelial cells were sometimes identified. Some animals showed scanty interstitial infiltration by lymphocytes or perhaps an occasional monocyte or swollen fibroblast. Rather infrequently the alveolar exudate contained a few large round cells with vesicular nuclei and large nucleoli which were considered as desquamated epithelial cells.

Such reactions were infrequent and slight in animals killed on the first day of fever. They appeared in about half of the animals taken

from the third to the ninth day and in 10 of the 12 killed on the eleventh and thirteenth days. In animals killed after the thirteenth day, intra-alveolar exudate was scantier and inconstant, and interstitial infiltration relatively more prominent, sometimes to the point of fairly marked septal thickening and partial atelectasis.

With the Q strain, the variegated alveolar exudate appeared earlier and became quite scanty and purely epithelioid by the seventh day. Interstitial infiltration was also somewhat less marked.

Trachea and mediastinum.—Sections of trachea at or near the bifurcation were studied in 66 animals. Focal mucosal lymphocyte infiltration was encountered in 41. It increased in frequency in later animals, occurring in 9 of 25 taken on the first, third, and fifth days, in 11 of 19 killed on the seventh and ninth days, and in 21 of 22 on the eleventh day and later.

Most of the animals killed on the ninth and eleventh days showed a more or less marked focal interstitial and submesothelial infiltration of the mediastinal fatty and areolar tissues by lymphocytes, less often with plasma cells and fibroblasts and mesothelial thickening. This reaction was absent in later stages. One guinea pig showed encapsulating purulent foci and 4 presented definite epithelioid granulomata which in 2 animals contained large multinucleate giant cells. Such lesions were absent in the animals killed on the first, third, fifth, and thirteenth days and occurred in 2 taken on the seventh day, 4 on the ninth, and 7 on the eleventh day from onset of fever.

Gastro-intestinal tract.—Sections were taken from the esophagus in the mid-thorax in 36 guinea pigs and at the cardiac end in 41. Stomach sections were made in all M and X strain animals, usually including pylorus, cardia, and lesser curvature. Three levels of sm ll intestine were regularly studied, and sections were taken from caecum, colon, and rectum.

Agminated and solitary lymphoid follicles were noted in 41 sections from 32 guinea pigs. Accumulation and phagocytosis of nuclear fragments within the germinal centers of these follicles were noted in 16 sections from 12 animals.

Reactions in lymphoid follicles of the intestines

Day from onset of fever	1st	3rd	5th	7th	9th	11th	13th	15th	20th	25th	Total
Lymphoid follicles present.											
Number of guinea pigs	4	5	6	3	5	3	1	0	3	2	32
Number of sections	5	8	8	4	6	3	1	0	4	2	41
Phagocytosis of nuclear debris											
Number of guinea pigs	1	2	2	3	0	0	1	0	3	0	12
Number of sections	2	3	2	4	0	0	1	0	4	0	16

These follicles were located chiefly in the ileum, fewer in other parts of the small and large intestines.

Otherwise, the mucosa of the intestine and stomach was usually normal. Pyogenic ulcers were seen in 3 guinea pigs, one in the fundus of the stomach, two in the rectum. Scattered pus-filled crypts with adjacent polymorphonuclear infiltration were noted in 8 guinea pigs, six in the caecum, two in the colon.

Focal interstitial and perivascular lymphocyte infiltration was noted in the mucosa of the cardia and in the corium and muscularis of the esophagus in 4 of 8 animals on the seventh day and in 7 of 8 on the ninth day from onset of fever, less often before and after that time. Similarly submucosal lymphocyte infiltration of the colon and rectum was noted in 19 of 24 animals killed on the seventh, ninth, and eleventh days and in only 3 of 24 taken on the first, third, and fifth days, and in 5 of 16 taken on or after the thirteenth day.

In the omentum and mesentery and in the serosal layers of the abdominal viscera, there were foci of more or less dense interstitial and perivascular infiltration by lymphocytes and sometimes plasma cells or monocytes as well. Less often patches of fibroblastic and mesothelial proliferation were noted, and in 5 guinea pigs single to few small compact or vacuolated granulomata of polygonal or stellate epithelioid cells were noted. In 2 guinea pigs, multinucleate giant cells were present in these nodules.

Few peritoneal focal lesions were seen in 4 of the 16 guinea pigs taken on the first and third days of fever, moderately numerous lesions were found in 5 of the 8 guinea pigs killed on the fifth day, relatively numerous and larger lesions in 25 of the 28 animals taken on the seventh to the thirteenth days, and some in 7 of the 12 killed on the sixteenth to twenty-fifth days from onset of fever. One granulomata appeared on the seventh, 2 on the eleventh, 1 on the thirteenth, and 1 on the twenty-fifth day.

Gastro-intestinal and peritoneal lesions showed no significant differences in frequency or severity between the two virus strains studied.

Liver.—The relation of periportal lymphocyte infiltration, the most frequent finding, to the "Q" fever virus reaction is uncertain, inasmuch as some such infiltration is present in many normal animals. However, there appeared to be a definite increase in frequency and density of this infiltration after the fifth day of the febrile reaction as compared with the first, third, and fifth days. No other significant alterations were seen on the first day of fever. Focal lesions appeared on the third day and were almost constantly present on and after the fifth

day from onset of fever, though they became fewer in number on the eleventh and thirteenth days but persisted as late as the twenty-fifth day.

These focal lesions are small foci of interstitial lymphocyte infiltration and small epithelioid granulomata. Lymphocytic foci not infrequently contain a few swollen endothelial cells or perhaps epithelioid cells. The small epithelioid granulomata are generally less than 200μ in diameter. They are composed of compactly disposed fusiform to polygonal epithelioid cells or less often of loosely packed stellate cells. They may include centrally a few compressed atrophic or, more often, coagulated necrotic liver cells, or a few, often fragmenting, polymorphonuclear leucocytes. Peripheral or interstitial lymphocyte infiltration is sometimes present, particularly in later stages. In a few guinea pigs killed on or after the eleventh day, centrally placed multinucleate giant cells with peripherally disposed nuclei were present in some of the granulomata. Sometimes such giant cells appeared apparently alone without accompanying epithelioid cells.

The familiar small recent and organizing infarcts of liver tissue so often seen in guinea pigs were present in 20 animals of this series. Their significance is questionable.

The *pancreas* was studied in 65 guinea pigs. Few foci of periductal and interlobular perivascular lymphocyte infiltration were noted, less often intralobular foci. Such focal lesions were found in 12 of the 16 animals killed on the ninth and eleventh days, and rarely in earlier or later animals. No difference was evident between the X and M strains. One paraductal granuloma containing a multinucleate giant cell and accompanied by lymphocyte infiltration was seen in an X strain animal on the twentieth day.

Spleen.- The splenic follicles were generally of moderate size and showed a moderate grade of mitotic activity. Large pale follicular reticulo-endothelial cells were often evident, but showed phagocytosis of nuclear fragments in relatively few animals. In 8 guinea pigs killed on the seventh to eleventh days, these pale reticulum cells showed proliferation in solid masses, forming definite granulomata of polygonal epithelioid cells in 5 of them.

The blood content of the splenic pulp was generally moderate or slightly increased, and there was generally a moderate focal lymphocyte infiltration. This cellular infiltration was more marked in some animals in the later stages, and in 5 (eleventh, thirteenth, sixteenth, twenty-fifth, and twenty-fifth days) there was an active splenic myelosis with large lymphoid and myeloid cells and megakaryocytes. Increased numbers of polymorphonuclear leucocytes were present in the pulp in about half of the animals killed on the first and third days of fever, and small clumps of leucocytes were often formed.

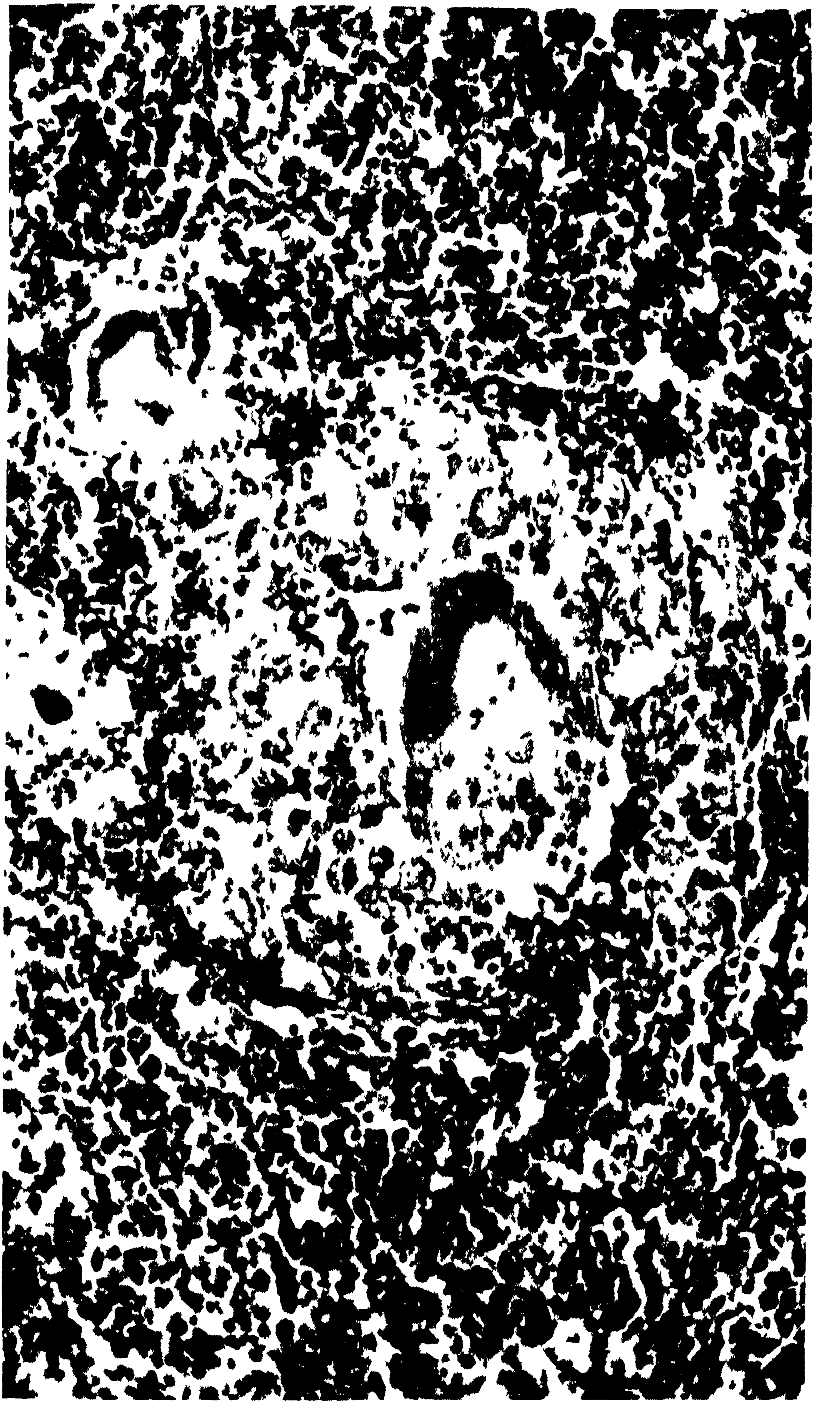

FIGURE 1.—Granuloma in spleen ninth day (X 300)

A more or less marked sinus reticulo-endothelial hyperplasia was evident in most of the guinea pigs. In 8 animals, 1 killed on the first day, 4 on the third, and 2 each on the fifth and seventh days, this reticulo-endotheliosis graded focally into vague nodules of polygonal epithelioid cells. Definite, well-defined granulomata appeared somewhat later and were present in 28 of the 40 animals killed on the fifth, seventh, ninth, and eleventh days. Occasional granulomata with giant cells were present in 5 of the 16 guinea pigs killed on the thirteenth, sixteenth, twentieth, and twenty-fifth days.

These granulomata were usually quite small, perhaps 100 to 200μ in diameter. When numerous, they were sometimes conglomerate in structure, forming nodules as large as 500μ in diameter. They were usually compact in structure and composed of polygonal or plump fusiform epithelioid cells. On the third and fifth days they often contained centrally a few polymorphonuclear leucocytes or some nuclear fragments, the latter being seen also through the seventh day. At about this time multinucleate giant cells with numerous small oval leptochromatic nuclei arranged in a peripheral ring or crescent were first seen in the centers of granulomata in some animals. On the ninth and eleventh days, these became more numerous and sometimes replaced most of the epithelioid cells in the granulomata. Usually one giant cell occupied the center of a nodule, but often two or even three giant cells were found in a single nodule. In some of the later animals masses of brown granular pigment were present in the centers of the giant cells.

Focal granulomatous lesions were distinctly more frequent in animals inoculated with the X strain (21 of 26 animals) than in those infected with the M or Q strains of "Q" fever virus (14 of 26, and 6 of 12, respectively).

Bone marrow.—Sections of vertebral marrow were studied in 51 guinea pigs. In general, myelocytes and metamyelocytes were the most numerous cell forms, with a gradual and relatively slight increase in polymorphonuclears later in the course of the disease.

Granulomata first appeared on the third day of fever in animals inoculated with the X strain and on the fifth day with the M virus strain. They ranged in number from 1 to 18 in a single cross section of a vertebra. Usually they were much vacuolated and composed of stellate epithelioid cells with a few polymorphonuclear leucocytes centrally, or occasionally some nuclear fragments. Compact nodules of polygonal cells were relatively infrequent, and nearly always accompanied by vacuolated nodules. Leucocytes became less frequent later in the course of the disease, and a few multinucleate giant cells were found only in 2 guinea pigs.

Granulomata were found in 3 of 16 animals taken on the first and third days, in 12 of 15 on the fifth and seventh days, in 12 of 16 on

the ninth and eleventh days, and in 1 of 16 animals taken on the thirteenth to twenty-fifth days.

Lymph nodes.—Common mesenteric nodes were studied in 59 guinea pigs, ileocecal in 26, pancreatic in 28, other abdominal in 8, and mediastinal in 43.

In the mesenteric and ileocecal nodes accumulation of nuclear fragments in the lymph clefts of the follicles and phagocytosis of these by swollen reticulo-endothelial cells was noted most often on the third day of fever. In the pancreatic nodes similar changes were infrequent and occurred later. This phagocytic activity was present in the mediastinal nodes in about half the animals from the third to the twenty-fifth day, and was evident in slight grade even on the day of onset of fever. Sinus reticulo-endothelial hyperplasia appeared in noteworthy grade and frequency on the seventh and ninth days in the various abdominal nodes, being infrequent and slight before and after that time. Sinus macrophage exudation was infrequent. Sinus hemorrhage and erythrophagia were seen in about one-fourth of the animals, most often in the common mesenteric and pancreatic nodes and on the seventh and ninth days. Patches of proliferation of closely packed fusiform fibroblasts in sinus areas were seen in a few abdominal nodes.

Occasional small granulomata of stellate, irregularly disposed fusiform or polygonal epithelioid cells were seen in some animals killed on the seventh, ninth, eleventh, sixteenth, twentieth, and twenty-fifth days. These occurred in the common mesenteric nodes in 14 of 33 guinea pigs killed on the seventh, ninth, eleventh, sixteenth, twentieth, and twenty-fifth days, in the ileocecal nodes in 1 of 3 on the ninth day, in the pancreatic nodes in 2 of 6 on the seventh day, and in the mediastinal nodes in 3 of 15 killed on the seventh and ninth days. Small granulomata were also encountered here in 2 guinea pigs killed on the twenty-fifth day. In 2 animals, accumulation of polymorphonuclear leucocytes was seen in the granulomata, and in 3 others the granulomata contained multinucleate giant cells with peripherally placed, oval, leptochromatic nuclei.

There is no evident difference in frequency of severity of lesions between the X and M virus strains.

Adrenals.—There was a moderate dechromaffinization of the medulla with accumulation of densely stained (green with Giemsa) chromaffin substance in phagocytes in the inner portion of the cortex. This was frequent in the animals taken on the ninth and eleventh days, infrequent earlier and later. With the Q strain chromaffin mobilization was less marked and less frequent. Focal lymphocyte infiltration was first noted in the medulla on the third day of fever in 2 of 8 guinea pigs with the X and M strains. It became more pronounced and more frequent by the seventh day and occurred in all of

the animals killed on the ninth and eleventh days and in 10 of 15 taken on the thirteenth, sixteenth, twentieth, and twenty-fifth days. Sometimes the focal cellular infiltration included large lymphoid and plasma cells as well. Five animals showed small granulomata of epithelioid cells, some with peripheral lymphocyte infiltration, in one including centrally a few polymorphonuclear leucocytes, in another some nuclear fragments. These were seen in animals taken on the seventh, ninth, and eleventh days.

Focal lesions appeared earlier and occurred in more of the animals infected with the X strain than with the M strain. With the Q strain lymphocyte infiltration appeared earlier, was usually slight in grade, and seldom extended to the cortex, and no granulomata were seen.

Kidneys.—In the earlier stages the kidneys showed only very moderate parenchymatous degeneration with slight and rather dubious focal vascular endothelial swelling in the cortex. A focal lymphocyte infiltration of the pelvic mucosa and fat appeared in some animals about the third to fifth day from onset of fever, somewhat earlier and more often with the X strain than with the M strain. On the fifth day with the X strain, on the third with the Q strain, and on the seventh with the M strain there was noted a more or less marked edema of the pelvic fatty and areolar tissue. This persisted through the thirteenth day in most of the guinea pigs, and in some as late as the twenty-fifth day. With the appearance of the edema the focal cellular infiltration of the pelvic tissues was often more pronounced, and in a few animals included plasma cells, monocytes, or polymorphonuclear leucocytes as well as lymphocytes. In 3 guinea pigs killed on the ninth, eleventh, and twentieth days, there were occasional small granulomata of stellate or polygonal epithelioid cells with peripheral lymphocyte infiltration. One similar granuloma was seen in the corticomedullary zone in an X strain animal on the twentieth day.

Occasional cortical foci of interstitial and perivascular lymphocyte infiltration were seen in a few animals killed on or before the seventh day from onset. These were present on the ninth and eleventh days in 13 of the 16 guinea pigs and in 6 they were fairly numerous or large. Similar foci persisted in some animals as late as the twenty-fifth day.

With the Q strain renal lesions appeared slightly earlier, were less extensive, disappeared earlier, and included no granulomata.

Bladder, prostate, and seminal vesicles.—In animals killed prior to the seventh day, the bladder usually showed no lesions. Twenty-one of the 24 guinea pigs killed on the seventh, ninth, and eleventh days showed few to moderately numerous foci of perivascular or diffuse lymphocyte infiltration in the mucosa, less often in the muscularis and serosa as well. Such focal lesions occurred in 4 of 8 animals killed on the thirteenth and sixteenth days and in 1 of 8 from the twentieth

and twenty-fifth days, and at this period were restricted to the mucosa. Vascular endothelial proliferation, focal fibroblast proliferation, patchy mucosal edema, and focal hemorrhages were relatively infrequent findings. Two animals killed on the seventh day showed single and occasional small mucosal granulomata, in the one vacuolated and composed of stellate epithelioid cells, in the other, compact and composed of fusiform fibroblasts and lymphocytes.

Generally the tubules of the prostate and seminal vesicles showed no lesions. The surrounding fatty and areolar tissue, particularly on the perineal aspect, often showed focal perivascular infiltration by lymphocytes. Such foci were present in 10 of 16 guinea pigs killed on the fifth and seventh days, in 17 of 20 taken on the ninth, eleventh, and thirteenth days, in 6 of 8 from the fifteenth and twentieth days, and in 2 of 15 on the first, third, and twenty-fifth days.

There was no difference in frequency of lesions between the M and X strains in the prostate, seminal vesicles, or urinary bladder.

Testicles.—Material taken on the first and third days of fever generally shows only minor degenerative changes and an entire absence of focal vascular lesions. The larger tubules at the lower pole of the epididymis contain at this stage numerous spermatozoa, those in the lower pole nearer the testis contain also small numbers of karyorrhectic rounded basophilic to oxyphilic germinal epithelial cells mixed with spermatozoa. Spermatogenesis in the testicular tubules shows some reduction in amount on the third day, and patches of rarefaction and reticulation of germinal epithelium appear in some animals. Such degenerative changes apparently reach their maximum about the seventh day from onset of fever, and thereafter spermatogenesis appears to increase in amount. In some animals areas of almost complete desquamation of germinal epithelium are present, only Sertoli cells remaining in the affected tubules. These degenerative changes are generally more severe and persist later with the X strain than with the M strain, and are less intense and disappear earlier with the Q strain.

Focal inflammatory lesions are commonest in the epididymis. They appear here about the fifth day. They consist of interstitial and perivascular infiltration by lymphocytes and sometimes plasma cells, and sometimes vascular endothelial and adventitial proliferation. Nodules of lymphocytes were seen among the veins of the pampiniform plexus in many of the animals, and some showed foci also in the polar fat. Foci of lymphocyte infiltration appeared in the testis in 7 animals, 4 with the X strain and 3 with the M strain on and after the seventh day. None were seen with the Q strain. Subacute purulent epididymitis was seen once with each virus strain, and a single case was noted with small epithelioid granulomata in the pampiniform plexus.

Focal inflammatory lesions perhaps appear slightly earlier with the Q and M strains, but are somewhat more numerous and more extensive with the X strain. They persisted to the thirteenth day from onset with the M and X strains, but were practically absent after the ninth day with the Q strain. With the X strain, some lesions were still present on the twenty-fifth day.

The *skeletal muscle* usually showed no focal lesions. Occasional foci of lymphocyte infiltration about fascial arterioles or venules or smaller interstitial vessels were noted in 9 of the 64 guinea pigs, 1 on the third, 1 on the fifth, 3 on the eleventh, and 4 on the sixteenth and twentieth days from onset of fever.

Central nervous system.—Focal lesions within the brain substance were rarely observed, a total of 9 such foci being noted in the 64 brains studied. Five of these were lymphocyte infiltration of vessel sheaths, 3 were small nodules of cellular gliosis, 1 of which was accompanied by endothelial proliferation of the adjacent small vessel, and 1 was a small compact granuloma of fusiform epithelioid cells. These 9 focal lesions occurred in 7 guinea pigs inoculated with the X strain and killed on the fifth, ninth, eleventh, thirteenth, sixteenth, and twenty-fifth days from onset of fever.

Occasional foci of meningeal lymphocyte infiltration were observed in more of the guinea pigs, and were more numerous on the ninth and eleventh days than earlier. These were present in most of the animals up to the twenty-fifth day.

Similarly, scattered foci of lymphocyte infiltration were observed in the choroid plexus of one or more ventricles. In earlier stages vascular endothelial swelling and proliferation often accompanied the cellular exudation. Foci were usually small or perhaps moderate in size and apparently more frequent with the M than with the X strain of virus

No lesions of the parenchyma of the spinal cord were observed. Few meningeal foci of lymphocyte infiltration were seen in 6 of the 8 guinea pigs killed on the ninth day, in about half of the animals taken on the seventh, eleventh, thirteenth, and sixteenth days, and seldom in earlier or later stages. Fifty-two spinal ganglia were found in the sections in 28 guinea pigs. Foci of capsular lymphocyte infiltration were noted in 2 animals, and of interstitial lymphocyte infiltration or sheath cell proliferation, or both, in 9.

Small foci of interstitial lymphocyte infiltration were noted also in sympathetic ganglia in 5 animals.

SUMMARY AND DISCUSSION

The reaction following intraperitoneal inoculation in guinea pigs with the Q, X, and M strains of the virus of "Q" fever is histologically essentially the same.

It is characterized by focal perivascular exudation of cells of the lymphocyte series, less often monocytes and fibroblasts, and vascular endotheliosis in the heart muscle, the lungs, the areolar and fatty tissues of the mediastinum, omentum, peritoneum, and gastro-intestinal submucosae, the adrenal medulla and inner cortex, the renal cortex and pelvis, the epididymis, and less often elsewhere. In the lungs are small foci, scarcely nodules, characterized by a quite sparse leucocyte, monocyte, and predominantly epithelioid cell alveolar exudate and an interstitial lymphocyte and monocyte infiltration, suggestive of but not identical in appearance with the pneumonitis seen in man and after intra-pulmonary inoculation in monkeys (*4*). There are, in the later stages of the process, quite frequent small nodules of epithelioid cells. Apparently in some locations these are preceded by clumps of polymorphonuclear leucocytes or soon infiltrated by them, and clumps of nuclear debris are often seen within the granulomata. Later multinucleate giant cells with usually peripheral nuclei are observed in the centers of many granulomata, and may almost entirely replace them. Such foci were seen most often in the spleen, liver, and vertebral marrow, less often in various lymph nodes, and infrequently in the heart, mediastinal and mesenteric fat, pancreas, adrenal, renal pelvis and cortex, bladder mucosa, testicle, and brain. Similar small epithelioid nodules have been reported in the spleen and bone marrow in monkeys (*4*). Serous exudates were quite frequently seen in the renal pelvic areolar tissues and infrequently in the epididymis. Compared with endemic and European typhus, or even with Rocky Mountain spotted fever, focal brain and cord lesions in the guinea pig are strikingly infrequent. Usually only occasional small foci of lymphocyte infiltration of meninges or of the chorioid plexus of one or more ventricles are found.

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TRAINING FOR NURSES (NATIONAL DEFENSE)

Nurses are the largest single group of professional workers in the health field. Even before war was declared, the demand for nurses far exceeded the supply. Nursing needs are becoming more acute every day. Public health agencies report numerous public health nursing positions for which no qualified candidates are available. Civilian hospitals are faced with a serious shortage of nurses, and several plans for augmenting the services of nurses through the use of volunteer and paid nurses' aides are being developed. The vastly increased demands of the military forces for nursing service make it imperative that the production of registered nurses be speeded up and that efficient use be made of every inactive nurse who is willing to return to active nursing service.

In anticipation of this need, in July 1940 a Nursing Council on National Defense was organized with representation from all branches of nursing and all Federal and national agencies concerned with the education and employment of large groups of nurses.

Two major objectives of this Council were: (1) To study the nursing resources of the country and to plan the most effective use of these resources; (2) to study the nursing educational resources and to plan for increased educational facilities to meet the demands for additional qualified nurses.

In order to accomplish the first objective, that of determining the "nurse power" of the country, it was proposed that a national inventory be made of all registered nurses. The Public Health Service was requested to be the official sponsor of this project, with the various State nurses' associations lending assistance.

In order to accomplish the second objective, that of determining the nursing educational resources and needs of the country, the Nursing Council appointed a committee known as the Educational Policies and Resources Committee, with Miss Isabel M. Stewart of Teachers College, Columbia University, as chairman.

An endeavor was made to interest certain foundations in this project but with little success. It was known that the United States Office of Education was the only Federal agency then receiving funds for the education of workers needed in the defense program, and it was decided to approach Dr. John W. Studebaker, United States Commissioner of Education, relative to this project.

Dr. Studebaker manifested a great deal of interest and understanding relative to the plan set forth by the nursing group and it was at his suggestion that Miss Stewart spent 2 weeks in the United States Office of Education preparing a plan for the expansion of the existing nursing educational facilities to meet national defense needs.

Upon the completion of the report a conference was called by Dr. Studebaker for the purpose of discussing Miss Stewart's recommendations. Representatives of the various nursing organizations and other Federal agencies were invited to this conference. The outcome of this meeting was the acceptance, in principle, of Miss Stewart's report.

After considerable study the committee was convinced that no large increase in the enrollment of student nurses could be accomplished unless financial assistance could be secured to provide more instructors, additional living facilities for the increased student group, and affiliations in certain clinical specialties such as psychiatry and pediatrics.

As a result of these preliminary studies, on July 1, 1941, the Congress made an appropriation of $1,200,000 for increasing the number of nurses under the "Training for Nurses (national defense) Act." Inasmuch as the Public Health Service was already responsible for the administration of funds for the training of public health personnel, the administration of the nurse training act was also assigned to the Public Health Service.

To guide the Public Health Service in the administration of this program and to assist in the preparation of regulations governing the allotment of funds, the Surgeon General requested the Subcommittee on Nursing, Health and Medical Committee, Office of Defense Health and Welfare, to serve as an advisory committee. The members of this committee were: Miss Mary Beard,[1] chairman, Major Julia Stimson, Sister M. Olivia Gowan, Miss Nellie X. Hawkinson, and Miss Marion Howell. In addition to the members of the Subcommittee on Nursing, the following three nursing education consultants were added to the advisory group: Miss Isabel M. Stewart, Mrs. Elizabeth Soule, Miss Anna D. Wolf.

The purpose of the appropriation made available under the nurse training act is to provide: (1) Refresher courses for inactive graduate nurses; (2) basic programs for student nurses; and (3) advanced programs for graduate nurses in special fields, including programs in midwifery. Funds may be used for tuition, subsistence, and other costs incidental to instruction. The funds may not be used to initiate new programs in basic and advanced nursing education, to construct buildings, or for cash payments to students.

In July and August three nursing education consultants were added to the staff of the United States Public Health Service nursing consultants. They were Margaret Arnstein, on leave from the New York State Department of Health; Eugenia K. Spalding, on leave from the Catholic University of America, Washington, D. C.; and

[1] On December 1, 1941, Miss Beard resigned as chairman and Miss Marion Howell was appointed to succeed her. Miss Marian Sheahan was appointed to fill Miss Howell's vacancy on the committee.

Lucile Petry, on leave from the University of Minnesota, Minneapolis, Minn. Miss Arnstein returned to her position in New York on the first of November and Miss Mary J. Dunn of the regular Public Health Service staff was placed in charge of this project beginning January 1, 1942.

All of the 1,300 accredited schools of nursing were given the opportunity to apply for Federal aid to conduct refresher courses for inactive graduate nurses. About 600 schools which were affiliated with hospitals having a daily average of 100 or more patients were invited to submit plans for an increased enrollment in their basic nursing programs.

On the basis of the original requests for aid, the following allotments were made for each of the three types of programs: $100,000 for refresher courses; $900,000 for basic nursing programs; and approximately $200,000 for advanced programs, including public health nursing. All schools making a request for Federal aid to assist in conducting refresher courses were given allotments. Over $6,000,000 was requested for basic nursing programs, which amount far exceeded the available funds.

The task of selecting the best out of the more than 200 plans submitted was a difficult one. Some schools were ruled out because they failed to meet the basic requirements as outlined in the regulations of the Surgeon General governing payments for training for nurses. Many were ruled out because of the schools' inability to provide sufficient clinical experience for the proposed increase in students in certain fields, principally pediatrics and obstetrics. In general, the plans were evaluated on the basis of the quality of educational program, the economy of the plan, and the geographic location of the school.

A number of schools which were given allotments in September found it impossible to secure the proposed increased number of students at that time. Funds which accrued owing to the failure of approved plans to materialize were reallotted to the same or to other schools for spring classes.

Table 1 shows the distribution by States of the schools allotted Federal funds for basic nursing programs in the fall of 1941 and the spring of 1942.

Table 2 shows the nursing programs receiving Federal funds by type, number approved, amount of allotment, and proposed increase in student admissions.

One of the greatest nursing shortages discovered at the time plans for basic programs were submitted was that for qualified nurse instructors. Requests for 400 additional instructors were made by these schools; consequently, the advanced curricula in nursing education merited serious consideration. The advanced programs in

special clinical fields are intended to improve the preparation of graduate nurses for their responsibilities as supervisors of nursing services, as well as for the teaching of student nurses in those special fields.

Only a small portion of the appropriation was set aside to assist in the public health nursing programs since other Federal funds are available for this purpose. However, when it was found that enrollment in public health nursing programs had decreased in the fall of 1941, the directors of these latter programs of study were notified that Federal funds might be used for the payment of student tuition and subsistence. Small additional allotments were made to 21 of the 28 universities or colleges offering public health nursing programs, as indicated in table 2.

TABLE 1.—*Distribution by States of schools receiving allotments for basic nursing programs*

State	Number of schools of nursing	Number of schools of nursing affiliated with hospitals having daily average of 100 or more patients	Number of schools allotted Federal funds	
			Fall 1941	Spring 1942
Total all States	1 330	638	60	56
Alabama	27	6	2	
Arizona	4	3		
Arkansas	9	2	1	
California	35	30	1	2
Colorado	16	14	2	
Connecticut	19	13	3	
Delaware	7	3		
District of Columbia	7	6	2	
Florida	14	3		
Georgia	17	11		1
Idaho	8	2		
Illinois	99	35	5	8
Indiana	28	17	2	
Iowa	29	7	3	1
Kansas	39	5		
Kentucky	16	8	1	
Louisiana	14	5	1	2
Maine	17	5	1	2
Maryland	23	12	2	1
Massachusetts	66	39	3	1
Michigan	34	27	2	1
Minnesota	30	23	4	2
Mississippi	36			
Missouri	34	22	4	3
Montana	10	4	1	
Nebraska	13	7		
Nevada				
New Hampshire	14	3		
New Jersey	45	34	1	1
New Mexico	2	1		
New York	105	83	4	3
North Carolina	44	8	1	
North Dakota	16	3		1
Ohio	68	43	4	3
Oklahoma	15	5		2
Oregon	10	6	2	
Pennsylvania	123	64		11
Rhode Island	7	7		1
South Carolina	16	5	2	
South Dakota	13			
Tennessee	22	10		2
Texas	44	15		2
Utah	6	4	1	4
Vermont	11	1		
Virginia	27	9	1	1

TABLE 1.—*Distribution by States of schools receiving allotments for basic nursing programs*—Continued

State	Number of schools of nursing	Number of schools of nursing affiliated with hospitals having daily average of 100 or more patients	Number of schools allotted Federal funds	
			Fall 1941	Spring 1942
Washington	24	9	1	1
West Virginia	31	4		1
Wisconsin	24	13	2	3
Wyoming	3			
Hawaii	2	1		1
Puerto Rico	7	1	1	

TABLE 2.—*Nursing programs*[1] *receiving Federal funds by type, number approved, amount of allotment, and proposed increase in student admissions*

Type of program	Number of programs	Federal funds allotted	Proposed increase in student admissions
All programs	265	$1,200,000	6,690
Refresher	81	90,675	3,244
Basic (undergraduate)	[2] 116	870,349	2,472
Postgraduate			
Administrative and educational	[3] 22	84,094	364
Clinical	17	47,202	191
Public health nursing	22	94 186	387
Anesthesia	5	4 694	21
Midwifery	2	8,800	11

[1] This does not include those that were approved and have withdrawn from the program
[2] 3 schools have both a fall and a spring operating program
[3] 5 schools have both a fall and a spring program

With the declaration of war the need for nurses on all fronts was immediately intensified. Requests for aid for refresher courses continued to be submitted in small numbers. Requests for financial aid and inquiries as to the availability of funds for basic and advanced nursing programs have increased markedly. The strategic place of the nurse instructor in any program for increasing student enrollment and consequently increasing the nursing power of the country is recognized. In view of these increased demands upon the nursing profession, a deficiency appropriation as well as a larger appropriation for next year has been requested. Many challenging problems in nursing education have come to the attention of the nursing education consultants. The possibilities of conserving instructional resources through plans for central schools, centralized teaching, and through combinations of nursing schools and colleges are among the most important. The problems of recruiting of well qualified candidates for schools of nursing influence all other problems in this field. The recruitment problem has been referred for direct action to the recruitment committee of the Nursing Council on National Defense.

DEATHS DURING WEEK ENDED FEBRUARY 14, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Feb 14, 1942	Corresponding week, 1941
Data from 88 large cities of the United States		
Total deaths	8 986	9,229
Average for 3 prior years	9,806	
Total deaths, first 6 weeks of year	55,607	60,067
Deaths per 1,000 population, first 6 weeks of year, annual rate	12 9	14 0
Deaths under 1 year of age	555	478
Average for 3 prior years	524	
Deaths under 1 year of age, first 6 weeks of year	3,379	3,244
Data from industrial insurance companies		
Policies in force	64,906 201	64,701 811
Number of death claims	9,807	12,490
Death claims per 1,000 policies in force, annual rate	7 9	10 1
Death claims per 1,000 policies, first 6 weeks of year, annual rate	10 0	11 0

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED FEBRUARY 21, 1942

Summary

Current reports show a sharp increase in the incidence of meningococcus meningitis, due principally to 30 cases reported in Texas. A total of 84 cases was reported for the current week, as compared with 42 for the preceding week and a 5-year (1937–41) median of 63 cases. The total reported cases to date this year (first 7 weeks) is 416, as compared with a 5-year cumulative median of 386. For the same periods in 1937 and 1938, respectively, 1,067 and 654 cases were reported. Excluding the current report from Texas, the highest incidence so far this year appears to be in the South Atlantic, Middle Atlantic, and North Central States.

A slight increase in the incidence of influenza was recorded, with 5,308 cases as compared with 5,180 cases for the preceding week, a 5-year median of 13,904, and 14,905 cases for the corresponding week last year. Texas, with 1,790 cases, reported the largest number. South Carolina (735), Arkansas (458), Alabama (453), and Virginia (427) were next in order of highest incidence. Only 5 other States reported more than 100 cases.

Of 26 cases of poliomyelitis, 5 occurred in New York and 3 in California. No other State reported more than 2 cases. Other reports include 14 cases of amebic dysentery (5 in Arkansas and 3 in Louisiana), 40 cases of bacillary dysentery (21 in Texas, 10 in Georgia), 39 cases of unspecified dysentery (30 in Virginia, 9 in Arizona), 1 case of anthrax each in Pennsylvania and Georgia, 41 cases of smallpox, of which 22 occurred in Texas, 13 cases of tularemia, and 32 cases of endemic typhus fever (12 in Georgia and 11 in Texas).

The crude death rate for the current week for 88 large cities in the United States is 13.2 per 1,000 population, as compared with 12.5 for the preceding week and a 3-year (1939–41) average of 13.3.

Telegraphic morbidity reports from State health officers for the week ended February 21, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that although none were reported cases may have occurred

Division and State	Diphtheria			Influenza			Measles			Meningitis meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Feb 21 1942	Feb. 22 1941		Feb 21 1942	Feb 22 1941		Feb 21 1942	Feb 22 1941		Feb 21 1942	Feb 22 1941	
NEW ENG.												
Maine	1	0	0	4	11	11	277	138	87	0	0	0
New Hampshire	0	0	0		16		0	15	20	0	0	0
Vermont	0	0	0				0	13	7	0	0	0
Massachusetts	3	1	4				450	376	370	4	4	2
Rhode Island	1	0	0				94	0	14	0	1	1
Connecticut	0	0	0	1	63	22	282	37	185	1	0	0
MID. ATL.												
New York	30	23	25	[1] 17	[1] 162	[1] 74	635	4 910	1 048	6	1	4
New Jersey	8	18	14	23	310	99	160	1 258	1 251	5	2	2
Pennsylvania	17	13	33				1 174	3 433	204	7	3	5
E. NO. CEN.												
Ohio	7	16	20	28	390	32	190	2 190	54	3	0	3
Indiana	3	13	13	31	29	66	43	226	12	0	0	0
Illinois	20	18	29	19	54	61	226	2 471	37	0	0	0
Michigan [2]	6	1	10	2	53	12	249	2 396	424	0	1	1
Wisconsin	0	2	1	28	273	183	411	662	662	0	0	0
W. NO. CEN.												
Minnesota	4	1	2	1	61	4	680	7	85	0	1	1
Iowa	4	7	7	3	300	42	200	195	158	0	0	1
Missouri	2	8	10	2	53	137	73	78	11	1	1	1
North Dakota	1	1	2	22	40	23	59	12	12	0	0	0
South Dakota	0	2	1	1	6	3		5	2	0	0	0
Nebraska	1	2	2	3	15	9	32	4	16	0	0	1
Kansas	1	3	8	17	45	45	251	272	272	0	0	1
SO. ATL.												
Delaware	2	1	1				6	216	34	0	0	0
Maryland [3]	1	2	2	9	103	107	433	77	77	5	2	2
Dist. of Col.	2	1	5	1	18	18	34	53	6	1	1	1
Virginia	7	13	15	427	1 979	1 338	70	1 338	188	6	3	4
West Virginia	5	6	7	53	321	321	525	183	21	0	3	4
North Carolina	10	10	17	59	435	71	1 585	313	343	2	0	0
South Carolina	4	1	4	735	2 246	1 116	126	237	30	0	4	1
Georgia	5	2	10	145	736	385	268	349	197	1	1	2
Florida	7	1	5	4	127	36	116	145	65	2	0	0
E. SO. CEN.												
Kentucky	5	6	10		117	117	54	560	106	0	0	8
Tennessee	11	9	9	79	604	307	113	123	123	1	3	2
Alabama	12	13	13	453	1 483	699	95	294	284	0	3	5
Mississippi [2]	7	1	5							2	1	1
W. SO. CEN.												
Arkansas	5	4	7	458	286	286	365	107	107	0	2	2
Louisiana	3	5	10	5	96	96	57	5	11	1	0	0
Oklahoma	10	2	8	227	310	310	404	14	14	0	1	1
Texas	0	39	51	1 790	3 100	3 100	1 881	577	414	30	0	1
MOUNTAIN												
Montana	8	1	1	1	55	37	168	3	8	0	0	0
Idaho	1	1	1			1	38	12	29	0	0	0
Wyoming	0	2	1	209	72	1	57	36	17	0	0	0
Colorado	4	7	8	161	61	35	0	147	91	2	0	0
New Mexico	0	1	1	2	32	19	53	85	63	0	1	0
Arizona	5	3	3	166	196	196	202	175	21	0	0	0
Utah [2]	0	2	2	7	43	16	55	8	81	0	1	0
Nevada	0	0					97	0		0	0	
PACIFIC												
Washington	4	5	1	3	11	11	54	141	141	0	1	1
Oregon	3	0	2	29	41	42	137	235	27	0	1	0
California	• 9	3	28	83	592	592	3 161	99	205	4	1	3
Total	215	27[illegible]	512	5 308	14 905	13 904	15 663	24 270	13 876	84	43	63
7 weeks	2 354	2 145	4 012	3 080	422 690	103 011	80 404	106 279	75 068	416	338	386

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended February 21, 1942, and comparison with corresponding week of 1941 and 5-year median—Con

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937 41	Week ended—		Median 1937–41
	Feb 21 1942	Feb 22 1941		Feb 21 1942	Feb 22 1941		Feb 21 1942	Feb 22 1941		Feb 21 1942	Feb 22 1941	
NEW ENG												
Maine	0	0	0	19	9	13	0	0	0	0	0	0
New Hampshire	0	0	0	5	4	4	0	0	0	1	0	0
Vermont	0	0	0	15	6	11	0	0	0	1	0	0
Massachusetts	0	0	0	373	105	[illegible]	0	0	0	3	1	2
Rhode Island	0	0	0	14	5	19	0	0	0	0	0	0
Connecticut	0	0	0	45	39	101	0	0	0	0	1	1
MID ATL												
New York	5	1	0	458	410	731	0	0	0	6	5	5
New Jersey	2	1	1	146	270	204	0	0	0	0	1	1
Pennsylvania	0	1	1	447	330	552	0	0	0	8	5	5
E NO CEN												
Ohio	2	0	0	370	262	240	0	4	4	4	4	4
Indiana	1	1	1	109	167	167	1	2	2	0	0	1
Illinois	1	1	1	247	432	656	0	1	21	1	3	5
Michigan [2]	1	3	1	800	232	538	4	0	0	1	3	3
Wisconsin	0	1	0	219	139	264	0	4	5	1	0	0
W NO CEN												
Minnesota	0	0	0	82	37	109	0	2	8	0	0	0
Iowa	0	0	0	47	55	142	0	10	29	0	1	1
Missouri	0	0	0	[illegible]	97	146	1	1	12	4	0	0
North Dakota	0	0	0	22	14	42	0	0	1	1	0	1
South Dakota	0	0	0	41	29	22	2	4	3	0	0	0
Nebraska	0	0	0	31	33	[illegible]	0	0	3	0	0	0
Kansas	0	0	0	96	45	170	1	3	5	1	1	2
SO ATL												
Delaware	1	0	0	59	[illegible]	13	0	0	0	0	0	0
Maryland [2]	0	0	0	78	[illegible]	43	0	0		1	1	1
Dist of Col	0	0	0	13	18	20	0	0	0	0	0	1
Virginia	0	2	1	[illegible]	41	41	0	0	0	2	5	3
West Virginia	0	1	1	37	35	[illegible]	0	0	0	1	0	2
North Carolina	2	2	1	[illegible]	[illegible]	42	1	0	0	0	0	1
South Carolina	0	0	0	11	15	[illegible]	0	0	0	2	7	[illegible]
Georgia	0	0	1	[illegible]	30	[illegible]	0	0	1	4	0	3
Florida	0	3	0	3	[illegible]	8	0	0	0	4	1	2
E SO CEN												
Kentucky	1	0	0	81	121	104	1	0	0	0	4	4
Tennessee	1	0	0	43	92	47	4	0	0	5	3	3
Alabama	0	0	0	17	[illegible]	23	1	1	0	1	1	2
Mississippi [2]	2	1	1	12	8	8	2	0	0	3	1	1
W SO CEN												
Arkansas	0	1	0	9	[illegible]	10	0	2	4	2	3	3
Louisiana	1	1	1	5	8	8	1	0	0	3	1	7
Oklahoma	0	0	0	[illegible]	13	44	0	1	1	2	2	2
Texas	0	0	2	68	[illegible]	108	22	0	4	0	2	9
MOUNTAIN												
Montana	0	1	0	37	33	33	0	0	1	0	2	0
Idaho	1	0	0	4	10	14	0	0	4	0	0	0
Wyoming	1	0	0	11	8	8	0	0	0	0	0	0
Colorado	1	0	0	58	25	34	0	1	7	0	2	0
New Mexico	0	0	0	7	5	13	0	0	1	0	0	0
Arizona	0	0	0	8	9	9	0	0	0	0	0	1
Utah [2]	0	1	0	48	3	26	0	0	0	0	1	0
Nevada	0	0		1	0		0	0		0	0	
PACIFIC												
Washington	0	1	0	57	32	56	0	0	1	0	0	0
Oregon	0	0	0	7	9	41	0	0	3	0	1	1
California	3	2	2	130	151	166	0	0	9	5	3	8
Total	26	25	25	4 069	3 612	5 518	41	36	253	87	65	105
7 weeks	180	204	159	25 941	23 882	37 320	138	338	2 081	580	479	776

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended February 21, 1942— Continued

Division and State	Whooping cough, Week ended— Feb 21, 1942	Whooping cough, Week ended— Feb 22, 1941	Week ended Feb 21, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	48	22	0	0	0	0	0	0	0	0	0
New Hampshire	4	0	0	0	0	0	0	0	0	0	0
Vermont	34	4	0	0	0	0	0	0	0	0	0
Massachusetts	204	172	0	0	0	0	0	0	0	0	0
Rhode Island	67	18	0	0	0	0	0	0	0	0	0
Connecticut	82	60	0	0	0	0	0	0	0	0	0
MID ATL											
New York	504	276	0	0	2	0	3	0	0	0	0
New Jersey	207	90	0	0	0	0	1	0	0	0	0
Pennsylvania	209	398	1	2	0	0	1	0	0	2	0
E NO CEN.											
Ohio	256	269	0	0	1	0	0	0	0	0	0
Indiana	19	13	0	0	0	0	0	0	0	0	0
Illinois	131	67	0	0	1	0	3	0	0	0	0
Michigan [2]	234	314	0	0	0	0	0	0	0	0	0
Wisconsin	252	146	0	0	0	0	2	0	0	1	0
W NO CEN.											
Minnesota	38	38	0	0	0	0	0	0	0	0	0
Iowa	[illegible]	38	0	0	0	0	0	0	0	1	0
Missouri	4	26	0	0	0	0	0	0	0	1	0
North Dakota	15	46	0	0	0	0	0	0	0	0	0
South Dakota	6	4	0	0	0	0	0	0	0	0	0
Nebraska	4	22	0	0	0	0	0	0	0	0	0
Kansas	46	120	0	0	0	0	0	0	0	0	0
SO ATL.											
Delaware	2	5	0	0	0	0	0	0	0	0	0
Maryland [2]	47	82	0	0	0	0	0	0	0	0	0
Dist of Col	32	7	0	0	0	0	0	0	0	0	0
Virginia	70	97	0	0	0	30	0	0	0	0	0
West Virginia	124	27	0	0	0	0	0	0	0	0	0
North Carolina	211	368	0	0	0	0	0	0	0	2	1
South Carolina	54	133	0	0	0	0	0	0	0	1	0
Georgia	18	22	1	1	10	0	0	0	0	1	12
Florida	19	7	0	0	0	0	0	0	0	0	4
E SO CEN											
Kentucky	86	55	0	1	0	0	0	0	0	0	0
Tennessee	37	57	0	0	0	0	0	0	0	1	0
Alabama	5	34	0	0	0	0	0	0	0	0	1
Mississippi [2]	----	---	0	0	0	0	0	0	0	2	0
W SO CEN.											
Arkansas	7	44	0	5	0	0	0	0	0	1	0
Louisiana	3	2	0	3	0	0	0	0	0	0	3
Oklahoma	9	22	0	0	0	0	0	0	0	0	0
Texas	162	348	0	0	21	0	0	0	0	0	11
MOUNTAIN											
Montana	15	24	0	0	0	0	0	0	0	0	0
Idaho	10	28	0	0	0	0	0	0	0	0	0
Wyoming	5	3	0	0	0	0	0	0	0	0	0
Colorado	33	69	0	0	0	0	0	0	0	0	0
New Mexico	22	17	0	0	0	0	0	0	0	0	0
Arizona	81	37	0	0	0	9	0	0	0	0	0
Utah [2]	19	70	0	0	0	0	0	0	0	0	0
Nevada	13	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	92	101	0	0	0	0	0	0	0	0	0
Oregon	19	5	0	0	0	0	0	0	0	0	0
California	185	280	0	2	5	0	0	0	0	0	0
Total	3,750	4,096	2	14	40	39	10	0	0	13	32
7 weeks	29,262	29,983									

[1] New York City only.

[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended February 7, 1942

This table lists the reports from 62 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Atlanta Ga	1	0	19	0	5	0	9	0	4	0	0	2
Baltimore Md	2	0	6	0	194	4	25	0	16	0	0	25
Billings Mont	0	0		0	0	0	0	0	0	0	0	0
Birmingham Ala	2	0	13	2	2	0	9	0	3	0	0	1
Boston Mass	0	0		1	65	1	12	1	100	0	0	63
Bridgeport Conn	0	0		0	0	0	0	0	5	0	0	0
Camden N J	1	0		0	13	0	0	0	7	0	0	5
Charleston S C	0	0	66	1	3	0	1	0	0	0	0	0
Chicago Ill	6	0	10	2	50	0	35	0	88	0	1	69
Cleveland Ohio	2	0	11	1	2	2	16	0	36	0	0	30
Columbus Ohio	0	0		0	8	0	4	0	4	0	0	0
Cumberland Md	0	0		0	4	0	0	0	0	0	0	0
Dallas Tex	4	0	1	1	80	0	6	0	5	0	0	5
Duluth Minn	0	0		0	2	0	1	0	8	0	0	5
Fall River Mass	0	0		0	0	0	1	0	35	0	0	0
Flint Mich	0	0		1	0	0	4	0	9	0	0	2
Fort Wayne Ind	1	0		0	0	0	3	0	1	0	0	0
Frederick Md	0	0		0	10	0	1	0	0	0	0	0
Galveston Tex	0	0		0	0	0	1	0	0	0	0	0
Grand Rapids Mich	0	0		0	12	0	0	0	4	0	0	15
Great Falls Mont	0	0		0	130	0	1	0	2	0	0	6
Hartford Conn	0	0		0	6	0	2	0	9	0	0	1
Houston Tex	0	0		0	8	0	8	0	2	0	1	5
Indianapolis Ind	0	0		0	12	0	4	0	19	0	0	17
Kenosha Wis	0	0		0	1	0	0	0	3	0	0	2
Little Rock Ark	0	0	20	0	53	0	9	0	0	0	0	2
Los Angeles Calif	7	0	24	3	122	1	15	0	17	0	0	20
Lynchburg Va	0	0		0	0	0	4	0	1	0	0	5
Milwaukee Wis	0	0		0	19	0	0	0	25	0	0	129
Minneapolis Minn	0	0		0	60	0	5	0	24	0	0	8
Mobile Ala	1	0		1	4	0	1	0	1	0	0	0
Nashville Tenn	0	0		1	4	0	2	0	3	0	0	12
Newark N J	0	0	5	0	22	0	4	1	17	0	0	35
New Haven Conn	0	0		0	98	0	2	0	1	0	0	2
New Orleans La	1	0	3	1	10	0	8	0	3	0	1	7
New York N Y	15	1	10	3	71	8	95	0	190	0	2	248
Omaha Nebr	0	0		0	2	0	1	0	3	0	0	0
Philadelphia Pa	1	1	3	3	33	1	36	0	100	0	0	39
Pittsburgh Pa	0	0	3	2	8	0	12	0	10	0	1	16
Providence R I	3	0	1	1	57	0	2	0	3	0	0	46
Racine Wis	0	0		0	3	0	0	0	5	0	0	24
Reading Pa	0	0		0	3	0	2	0	0	0	0	0
Richmond Va	1	0		0	0	0	2	0	2	0	0	0
Roanoke Va	0	0		0	0	0	0	0	0	0	0	0
Rochester N Y	0	0		1	5	0	2	0	10	0	0	8
Sacramento Calif	1	0	1	0	177	0	1	0	[illegible]	0	0	15
Saint Joseph Mo	0	0		0	1	0	4	0	2	0	0	0
Saint Louis Mo	1	0	4	1	71	1	11	0	26	0	0	6
Salt Lake City Utah	0	0		1	1	0	1	0	5	0	0	5
Shreveport La	0	0		0	7	0	4	0	0	0	1	0
Springfield Ill	0	0		0	17	0	2	0	3	0	0	0
Springfield Mass	0	0		0	10	0	4	0	18	0	0	36
Superior, Wis	0	0		0	0	0	0	0	2	0	0	3
Syracuse N Y	0	0		0	7	0	3	0	9	0	0	52
Terre Haute Ind	0	0		0	1	0	2	0	1	0	0	0
Topeka Kans	0	0		0	5	0	2	0	6	0	0	7
Trenton N J	0	0		0	2	0	0	1	7	0	0	10
Wheeling W Va	0	0		0	70	0	1	0	0	0	0	1
Wichita Kans	0	0		0	9	0	4	0	6	0	0	2
Wilmington Del	0	0		2	2	0	4	0	18	0	0	0
Winston Salem N C	0	0	6	0	91	0	2	0	0	0	0	1
Worcester Mass	0	0		0	9	0	6	0	16	0	1	22

Anthrax —Cases New Orleans 1

Dysentery amoebic Cases Cleveland 1 Little Rock 1 New York 1

Dysentery bacillary —Cases Chicago 1 Los Angeles 2 New York, 6

Tularemia —Cases St Louis, 1

Typhus fever —Cases Houston 1, Los Angeles 1, New York, 1 Richmond, 1

Rates (annual basis) per 100,000 population for a group of 62 selected cities (population, 1942, 27,086,492)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Feb 7, 1942	9 63	39 66	5 58	309 36	76 04	175 37	0 00	1 54	195 20
Average for week, 1937 41	19 89	329 85	22 21	628 42	128 62	239 28	5 60	3 86	171 88

TERRITORIES AND POSSESSIONS

HAWAII TERRITORY

Plague (rodent).—Five rats found during the period January 2 to 10, 1942, in Paauhau, Hamakua District, Island of Hawaii, T. H., have been proved positive for plague.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended January 24, 1942.—During the week ended January 24, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		9	3	5	8	1	1		4	31
Chickenpox		21		300	566	128	28	9	119	1,171
Diphtheria		28		26	6	1			1	62
Dysentery				3						3
German measles		2		33	35	21	19	16	23	149
Influenza		33			3	38			37	111
Leprosy									1	1
Measles		8		379	134	158	44	20	31	774
Mumps		9	-	335	419	148	71	87	317	1,386
Pneumonia	3	15			10		2		18	18
Psittacosis					1					1
Scarlet fever		10	7	80	310	39	31	43	24	544
Trachoma									2	2
Tuberculosis	1	4	8	89	58	24		3		187
Typhoid and paratyphoid fever			2	13	1	1			1	18
Undulant fever					3	1				4
Whooping cough		40	1	187	89	5	14		25	361
Other communicable diseases	2	25		4	221	51	1	1	30	335

TRINIDAD

Poliomyelitis.—According to information dated February 9, 1942, poliomyelitis has been reported on the Island of Trinidad, as follows: October 1941, 4 cases, 1 death; November, 12 cases, 4 deaths; December, 35 cases, 7 deaths; January 1942, 80 cases, 4 deaths. The disease seems particularly prevalent among persons under 10 years of age.

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls International Office of Public Health Pan American Sanitary Bureau health section of the League of Nations and other sources The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given

CHOLERA

[C indicates cases P present]

NOTE —Since many of the figures in the following tables are from weekly reports the accumulated totals are for approximate dates

Place		January November 1941	December 1941	January 1942—week ended— 3	10	17	24	31
ASIA								
Afghanistan Southern Province	C		P					
Ceylon	C	3						
China								
Canton	C	464						
Hong Kong	C	1 667						
Macao	C	1 473	2					
Shanghai	C	834						
India	C	89 922						
Bombay	C	1						
Calcutta	C	2 119	18					
Rangoon	C	116						
India (French)	C	34						
Japan Taiwan	C	2						

PLAGUE

[C indicates cases P present]

Place		January November 1941	December 1941	January 1942—week ended— 3	10	17	24	31
AFRICA								
Belgian Congo	C	[1] 39						
British East Africa								
Kenya	C	686	36					
Tanganyika Territory	C	2						
Uganda	C	180	4					
Egypt Port Said	C	10						
Madagascar	C	248	7					[2] 22
Morocco	C	2 181	29	4	2	5	6	4
Casablanca [3]	C	4						
Tunisia **Tunis**	C	2						
Union of South Africa	C	93						
ASIA								
China								
Fukien Province [4]								
Foochow	C	3						
Dutch East Indies								
Java and Madura	C	484						
West Java	C	368						
India	C	4 150						
Calcutta	C	3						
Rangoon	C	9	P					-
Indochina (French)	C	25						
Palestine **Haifa**	C	11					1	
Plague infected rats	C	25						
Thailand Lampang Province	C	3						
EUROPE								
Portugal Azores Islands	C	2	1					
NORTH AMERICA								
Canada—Alberta—Plague infected ground squirrel		1						

[1] Includes 2 cases of pneumonic plague

[2] For the month of January

[3] A report dated June 23 1941 stated that an outbreak of plague had occurred in Casablanca Morocco, where several deaths had been reported

[4] A report dated Nov 22 1941 stated that bubonic plague had appeared in epidemic form in Shaowu and Yangkow Fukien Province

PLAGUE—Continued

[C indicates cases, P present]

Place		January-November 1941	December 1941	January 1942 week ended— 3	10	17	24	31
SOUTH AMERICA								
Argentina								
Buenos Aires Province	C		3					-
Cordoba Province	C	[5] 43	7					-
Mendoza Province	C	3						
Santa Fe Province Plague infected rats		67						
Santiago del Estero Province	C	2						
Brazil								
Alagoas State	C	36						-
Bahia State	C	10						-
Pernambuco State	C	70						-
Rio de Janeiro State	C	2						
Chile								
Santiago	C	[6] 1						-
Valparaiso	C	1						
Ecuador	C	33						
Peru								
Ancash Department	C	10						-
Lambayeque Department	C	3						
Libertad Department	C	11	1					
Lima Department	C	17	7					
Moquegua Department Ilo	C	7			—			
Piura Department	C	10	1					-
OCEANIA								
Hawaii Territory [7] Plague infected rats		66	9	1	4			-
New Caledonia	C	11						

[5] Includes 3 cases of pneumonic plague
[6] Imported
[7] During April and May 1941 4 lots of plague infected fleas were also reported in Hawaii Territory

SMALLPOX

[C indicates cases]

AFRICA								
Algeria	C	747	188		67			45
Angola	C	29						
Belgian Congo	C	682						
British East Africa	C	72						-
Dahomey	C	467						
French Guinea	C	45						
Gold Coast	C	312						
Ivory Coast	C	40						
Morocco [2]	C	648						[3] 441
Nigeria	C	985	41					
Niger Territory	C	271	2					
Portuguese East Africa	C	9						-
Portuguese Guinea	C	20						-
Rhodesia Southern	C	86						-
Senegal	C	65						-
Sierra Leone	C	15						-
Sudan (Anglo Egyptian)	C	7						-
Sudan (French)	C	19						-
Tunisia Tunis	C		1					
Union of South Africa	C	758						
ASIA								
Ceylon	C	114						-
China	C	259						-
Chosen	C	696						-
Dutch East Indies Bali Island	C	3						-
India	C	24 469						-
India (French)	C	9						-
India (Portuguese)	C	70						--
Indochina (French)	C	1,181	117					----
Iran	C	8						---
Iraq	C	1 417	38					---

[1] For June
[2] A report dated Dec 31 1941 stated that an epidemic of smallpox had occurred near Casablanca, Morocco, where about 100 cases per week were reported
[3] For January 1942

SMALLPOX—Continued

[C indicates cases]

Place		January–November 1941	December 1941	January 1942—week ended— 3	10	17	24	31
ASIA—continued								
Japan	C	200						
Straits Settlements	C	1						
Syria	C	1						
Thailand	C	303						
EUROPE								
France	C	1						
Portugal	C	42	11		2			
Spain	C	420	28	3	3	5		
Switzerland	C	1						
NORTH AMERICA								
Canada	C	25						
Dominican Republic	C	2						
Guatemala	C	6						
Mexico	C	317						
Panama Canal Zone (alastrim)	C	[4] 1						
SOUTH AMERICA								
Bolivia	C	18						
Brazil	C	[6] 1						
Colombia	C	933	2					
Paraguay	C	[5] 8						
Peru	C	778						
Uruguay	C	-						
Venezuela (alastrim)	C	239	15					

[4] For September
[5] For January, February, and March
[6] For August

TYPHUS FEVER

[C indicates cases]

Place		January–November 1941	December 1941	January 1942—week ended— 3	10	17	24	31
AFRICA								
Algeria	C	10 750	2 077					
British East Africa, Kenya	C	10	2					
Egypt	C	9 324						
Morocco [1]	C	1 077	290	115	323	216	315	474
Sierra Leone	C	5						
Tunisia	C	6 040	1 038	187	346			
Union of South Africa	C	780						
ASIA								
China	C	245						
Chosen	C	425						
Dutch East Indies, Sumatra	C	136						
India	C	4						
Iran	C	105						
Iraq	C	53						
Japan	C	864						
Malaya, Unfederated States	C	1						
Palestine	C	15	34	2		2		
Straits Settlements	C	8						
Trans-Jordan	C	9						
EUROPE								
Bulgaria	C	243	41	13	3	6		
France (unoccupied zone)	C	2						
Germany	C	1 890	268	85				
Gibraltar	C	2						
Greece	C	7						
Hungary	C	441	31	39		15	29	
Irish Free State	C	26						
Poland	C	96[illegible]						
Portugal	C	5						
Rumania	C	1 113	708	180		192	184	
Spain	C	9 327	233					
Switzerland	C	5						
Turkey	C	676						
Yugoslavia	C	78						

[1] Information dated Dec. 31, 1941, reports typhus fever present in epidemic form in Casablanca, Morocco.

TYPHUS FEVER—Continued

[C indicates cases]

Place		January–November 1941	December 1941	January 1942—week ended— 3	10	17	24	31
NORTH AMERICA								
Jamaica	C			1				
Guatemala	C	181	10					
Mexico	C	203	8					
Panama Canal Zone	C	3						
Puerto Rico	C	10	2		1			
SOUTH AMERICA								
Bolivia	C	[2]75						
Brazil	C	1						
Chile	C	337			4			
Colombia	C	11						
Ecuador	C	119	8					
Peru	C	[3]1,079						
Venezuela	C	58	1					
OCEANIA								
Australia	C	14						
Hawaii Territory	C	56	4	3		1		

[2] For January, February, and March.
[3] January to June, inclusive.

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January–November 1941	December 1941	January 1942—week ended— 3	10	17	24	31
AFRICA								
Belgian Congo:								
Aba	C		[1]2					
Kumvulu	C	1						
Libenge	C	1						
Stanleyville	D	[1]1						
British East Africa—Uganda	C	1						
Dahomey—Grand Popo	C		[1]2					
French Equatorial Africa:								
Gabon	C	2						
Mayumba	C	4						
French Guinea	C	3						
French West Africa	C							1
Gold Coast	C	[2]3						
Accra	C	1						
Ivory Coast	C	[3]7	[1]1		1			
Nigeria	C	[1]1						
Senegal[4]								
Sierra Leone—Freetown	C							[5]1
Spanish Guinea	D	4						
Sudan (French)	C	[6]10	[1]1					[1]1
SOUTH AMERICA[7]								
Brazil:								
Amazonas State	D	4						
Bahia State	D	2						
Para State	D	8						
Colombia:								
Antioquia Department	D	3						
Boyaca Department	D	8						
Intendencia of Meta	D	14	1					
Santander Department	D	20						
Tolima Department	D	1						
Peru—Junin Department	C	5						
Venezuela—Bolivar State	C	1						

[1] Suspected.
[2] Includes 1 suspected case.
[3] Includes 2 suspected cases.
[4] According to information dated Feb. 9, 1942, 15 deaths from yellow fever among Europeans have occurred in Senegal.
[5] For January 1942.
[6] Includes 4 suspected cases.
[7] All yellow fever in South America is of the jungle type unless otherwise specified.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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STATE DIPHTHERIA IMMUNIZATION REQUIREMENTS

COMPARATIVE ANALYSIS OF STATUTES AND HEALTH DEPARTMENT REGULATIONS

By WILLIAM FOWLER, *United States Public Health Service*

In a survey of the existing statutes [1] and health department regulations of the 48 States and of Alaska, the District of Columbia, Hawaii, and Puerto Rico for express provisions relative to the requirement of immunization against diphtheria, such provisions were found in 9 States and Alaska. In 5 of these 9 States and in Alaska, the provisions were statutory [2] while in the other 4 States [3] they were found in the regulations of the State departments of health.

In only 1 State (North Carolina) is the general immunization of children required, the statute applying to children between 6 and 12 months of age and to those between 12 months and 5 years who have not been previously immunized. The statute excepts children whose parents or guardians are bona fide members of a religious organization whose teachings are contrary to the practices required by the law.[4]

The West Virginia statute requires the immunization of pupils entering the public schools for the first time in the State. Alaska has also been classified in this study as requiring, under certain conditions, the immunization of pupils.[5] The Alaska law provides that

[1] The search for the laws has included all of the regular and special sessions for 1941 except the following Regular session in Massachusetts and special session in California

[2] New Jersey, Statutes Annotated, secs 18 14-64 2 18 14-64 4, North Carolina, Code of 1939 Annotated, sec 7169 (1), North Dakota, 1913-1925 Supplement to the 1913 Compiled Laws, secs 425a1 425a2, Virginia, 1940 Cumulative Supplement to Code of 1936, sec 1493, West Virginia, Code of 1937 Annotated, sec 1285, Alaska, Compiled Laws 1933, secs 1677 [as amended by Laws 1937, c 30], 1678, 1682, 1684 The chronological order of these statutes is as follows North Dakota (1919), Alaska (1929), West Virginia (1937), Virginia (1938), New Jersey (1939), North Carolina (1939)

[3] Illinois, Kansas, Kentucky, and New York.

[4] For a discussion of this North Carolina law see 17 North Carolina Law Review 360-362

[5] In this connection it may be noted that Hawaii has a board of health regulation (not included in this study) which reads "All children upon entering school for the first time shall be examined either by their family physician or by physicians appointed by the board of health This examination shall include vaccination against smallpox and immunization against diphtheria " In a letter the Territorial commissioner of public health speaks of this regulation as "requiring immunization of all school children against diphtheria."

school authorities "are authorized and empowered to, and shall, require, if in the judgment of the Territorial Health Officer such action is necessary for the welfare of the community, the children attending said school to be vaccinated against such diseases as the Territorial Health Officer may specify." In both of these jurisdictions the statutes make provision for exemption from immunization. In Alaska a child's parents or guardian may object to immunization on the ground of religious principles, while in West Virginia exemption may be based on a reputable physician's certificate showing impossibility or impropriety of successful immunization or sufficient reason why immunization should not be done.

The only provision found expressly giving power to require immunization as a prerequisite to school attendance by pupils is in the New Jersey statute. This law also allows exemption based either on unfitness to receive immunization or immunity.

A Kansas regulation provides for the exclusion from school of nonimmunized pupils between 5 and 12 years of age when diphtheria is present in a school district, if deemed necessary by the secretary of the State board of health.

One State, North Dakota, has a statute which forbids making any form of vaccination or inoculation a condition precedent for admission to any public or private school or college, or for the exercise of any right, the performance of any duty, or the enjoyment of any privilege.

Illinois, Kentucky, and New York have regulations regarding immunization in institutions. In Illinois Schick positive nurses attending diphtheria cases or carriers in general hospitals must be immunized. Kentucky has a similar provision except that it omits mention of carriers. The New York requirement of immunization applies to nonimmune persons under 15 who seek admission to the State reconstruction home, but the superintendent may waive this requirement when an emergency exists which requires immediate admission.[6]

The Virginia statutory provision is one authorizing local boards of health to provide for the administering of toxoid, if in their opinion it be necessary to prevent an epidemic.

A search disclosed no court decisions pertaining to diphtheria immunization.

The following tables chart in more detail the principal provisions of the various laws and regulations on diphtheria immunization.

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[6] In a letter from the New York State Department of Health it is stated: "* * * the State department of mental hygiene in its General Order No 21 to all State institutions in regard to immunization of patients and employees requires the following:

"1 Superintendents shall arrange for the immunization of all new admissions and of new employees against smallpox, typhoid fever, and diphtheria as soon after they enter the institution as practicable but only when the physical condition of the person warrants the procedure

"2. Insistence on the observance of this rule against the objection of an employee usually is not warranted.'"

Diphtheria immunization requirements

Provisions of statutes or regulations	State
I. IMMUNIZATION OF CHILDREN GENERALLY REQUIRED	
A. Children covered:	North Carolina
1. Those between 6 and 12 months.	
2. Those between 12 months and 5 years not previously immunized.	
B. Duty of parents or guardian:	
1. To have administered to child an immunizing dose of a prophylactic diphtheria agent meeting standard approved by U. S. Public Health Service for such biologic products.	
2. To present child (a) to a regularly licensed physician in State, or (b) if unable to pay, to (1) health officer of county where child resides or (2) county physician if there is no regularly employed county health officer.	
C. Certificate of immunization by physician administering same:	
1. To give parent's or guardian's name and address, child's name and age, and date of administration.	
2. To be submitted by physician to local health officer or, where there is no health officer, to county physician.	
3. To be filed as permanent record by local county registrar for births.	
4. To be presented to school authorities upon admission to any public, private, or parochial school.[1]	
D. Immunization requirement not applicable to children whose parents or guardians are bona fide members of religious organization whose teachings are contrary to the practices required by the statute.	
II. IMMUNIZATION REQUIRED FOR SCHOOL ATTENDANCE[2]	
A. Persons covered: Pupils.	Alaska,[3] West Virginia.[4]
B. Necessary evidence as to immunization: Pupil, unless giving on admission satisfactory proof of previous immunization or reputable physician's exemption certificate, not admitted after first month of attendance until successfully immunized or producing reputable physician's certificate of (a) successful immunization or (b) exemption.	West Virginia.
C. Schools covered:	
1. In incorporated municipalities and in school districts outside of incorporated cities.	Alaska.
2. Public.	West Virginia.
D. Exemption from immunization:	
1. Ground for:	
a. Religious principles.	Alaska.[5]
b. Impossibility or impropriety of successful immunization or sufficient reason why immunization should not be done.	West Virginia.
2. Showing required:	
a. Written objection by child's parents or guardians.	Alaska.[5]
b. Reputable physician's certificate showing impossibility, etc. (See II D 1 b.)	West Virginia.
E. Certificate showing successful immunization shall be given by health officer or physician to person whom he has immunized or may be given to person known to have been successfully immunized.	Do.
III. IMMUNIZATION MAY BE REQUIRED AS PREREQUISITE TO SCHOOL ATTENDANCE BY PUPILS	
A. Power to require vested in board of education of any school district.	New Jersey.
B. Exemption from immunization:	
1. Ground for:	
a. Unfitness to receive immunization.	
b. Immunity to diphtheria known by evidence of appropriate test.	
2. Showing required:	
a. Physician's certificate as to unfitness.[6]	
b. Certificate by physician or by board of health or health officer of municipality where pupil resides as to immunity.[7]	
C. Miscellaneous provisions:	
1. Board of education may require or waive proof of immunity.	
2. Pupil not complying with immunization requirement may be excluded from school.	
3. Pupil who has had diphtheria and can furnish proof thereof satisfactory to school medical inspector must submit to immunity test and, if immune, need not be immunized, but if susceptible is subject to requirement.	

[1] No certificate for admission required as to children mentioned in I D.

[2] See I C 4.

[3] Vaccination (immunization) required if, in Territorial health officer's judgment, necessary for community's welfare.

[4] Pupils entering school for first time in State except those giving satisfactory proof of previous immunization or reputable physician's exemption certificate.

[5] No exemption from physical examination and vaccination when in judgment of school authorities or physician child shows symptoms of physical defects or shows symptoms of or has been exposed to any contagious, infectious, obnoxious, or communicable disease.

[6] Certification to have approval of school medical inspector.

[7] Certification and test to have approval of school medical inspector.

Diphtheria immunization requirements

Provisions of statutes or regulations	State
IV EXCLUSION FROM SCHOOL OF NONIMMUNIZED PUPILS DURING PREVALENCE OF DIPHTHERIA REQUIRED IF DEEMED NECESSARY BY SECRETARY AND EXECUTIVE OFFICER OF STATE BOARD OF HEALTH	
A Pupils excluded Those between 5 and 12 years not previously immunized	Kansas
B Schools covered In any school district when diphtheria is present in district	Kansas
C Period of exclusion Until 14 days after appearance of any new cases in district	Kansas
D Readmittance to school As soon as satisfactory evidence of immunization is presented health officer	Kansas
V PROHIBITION AGAINST REQUIRING IMMUNIZATION	
A No form of vaccination or inoculation to be made condition precedent for admission to any public or private school or college or for exercise of any right, performance of any duty or enjoyment of any privilege	North Dakota
VI IMMUNIZATION IN INSTITUTIONS	
A Persons required to be immunized	
1 Schick positive nurses attending diphtheria cases or carriers in general hospitals	Illinois
2 Schick positive nurses attending diphtheria cases in general hospitals	Kentucky
3 Nonimmune persons under 15 seeking admission to State reconstruction home at West Haverstraw	New York [8]
B Immunization requirement may be waived by reconstruction home superintendent when in his judgment emergency exists requiring immediate admission	Do
VII MISCELLANEOUS PROVISIONS	
A Local boards of health may if in their opinion it be necessary to prevent epidemic, provide for administering of toxoid	Virginia

[8] Immunity determined through Schick test

DIRECTORY OF FULL-TIME LOCAL HEALTH OFFICERS, 1942

This directory has been compiled from data furnished by the State health officers The definition of a "full-time" health officer is "one who does not engage in the practice of medicine or in any other business but devotes all his time to official duties " The tabulation presented gives the full-time health officers for five distinct classifications of local health jurisdictions Prime numerals appearing after the names of the health units indicate the type of jurisdiction, as follows 1, county, 2, city, 3, city-county, 4, State district; and 5, local district A city-county unit is one that includes the county and at least one city of 10,000 or more population contributing tax revenue to the cooperative health budget The component parts of districts are counties unless otherwise designated

Local health unit	Name of health officer	Post office address	Official title
Alabama			
Autauga [1]	G E Newton M D	Prattville	County health officer
Baldwin [1]	W B Nelson, M D	Bay Minette	Do
Barbour [1]	H G Clark M D	Clayton	Do
Bibb [1]	Temporary vacancy	Centerville	Do
Blount [1]	I M Towns M D	Oneonta	Do
Bullock [1]	C W McDonald M D	Union Springs	Do
Butler [1]	O F Gay M D	Greenville	Do
Calhoun [1]	J M Kinmey M P H M D	Anniston	Do
Chambers [1]	A I Ierky M T H M D	LaFayette	Do
Cherokee [1]	S C Tatum M D	Center	Do
Chilton [1]	Mary Walton M D	Clanton	Do
Choctaw [1]	Myrtle Lee Smith M D	Butler	Do
Clarke [1]	I L Connell M D	Grove Hill	Do

Local health unit	Name of health officer	Post office address	Official title
Alabama—Con			
Clay [1]	M L Shaddix M D	Ashland	County health officer
Cleburne [1]	Corinne S Eddy M S, M D	Heflin	Do
Coffee [1]	G L Weidner M D	Elba	Do
Colbert [1]	R F Harper M D	Tuscumbia	Do
Conecuh [1]	F I Kelly M D	Evergreen	Do
Coosa [1]	Temporary vacancy	Rockford	Do
Covington [1]	C D McLeod M D	Andalusia	Do
Crenshaw [1]	J O Foster M D	Luverne	Do
Cullman [1]	M S Whiteside M D	Cullman	Do
Dale [1]	W I Orr M D	Ozark	Do
Dallas [1]	L F Lee M D	Selma	Do
De Kalb [1]	C A F Holler M D	Fort Payne	Do
Elmore [1]	C S Cotlin Jr M P H M D	Wetumpka	Do
Escambia [1]	Iva G Murphy M D	Brewton	Do
Etowah [1]	C L Murphree M P H M D	Gadsden	Do
Fayette [1]	H D Barber M D	Fayette	Do
Franklin [1]	N P Underwood M D	Russellville	Do
Geneva [1]	Bertha F Stokes M D	Geneva	Do
Greene [1]	Temporary vacancy	Eutaw	Do
Hale [1]	do	Greensboro	Do
Henry [1]	R H Allen M D	Abbeville	Do
Houston [1]	W T Burkett M D	Dothan	Do
Jackson [1]	J F Haun M D	Scottsboro	Do
Jefferson [1]	George A Denison M D	Birmingham	Acting health officer
Lamar [1]	H A McClure M D	Vernon	County health officer
Lauderdale [1]	J F Dunn M D	Florence	Do
Lawrence [1]	W J Craig M D	Moulton	Do
Lee [1]	A H Graham D P H M D	Opelika	Do
Limestone [1]	F M Hall M P H M D	Athens	Do
Lowndes [1]	E F Leatherwood M D	Hayneville	Do
Macon [1]	Murray Smith M D	Tuskegee	Do
Madison [1]	W C Hatchett M D	Huntsville	Do
Marengo	E N Haller M D	Linden	Do
Marion [1]	H C McRee M D	Hamilton	Do
Marshall [1]	Lee Weathington M D	Guntersville	Do
Mobile [1]	O L Chason D P H M D	Mobile	Do
Monroe [1]	Madelene M Donnelly M D	Monroeville	Do
Montgomery [1]	J I Bowman M D	Montgomery	Do
Morgan [1]	I R Murphree M P H M D	Decatur	Do
Perry	J R Long M D	Marion	Do
Pickens [1]	R W Crowell M D	Carrollton	Do
Pike	W H Abernethy M D	Troy	Do
Randolph [1]	E A Cook M D	Wedowee	Do
Russell [1]	R W Dodd M D	Phenix City	Do
Shelby [1]	F F Sloan M D	Columbiana	Do
St Clair [1]	Temporary vacancy	Pell City	Do
Sumter [1]	F M Moore M D	Livingston	Do
Talladega [1]	J H Hill M D	Talladega	Do
Tallapoosa [1]	I H Hammer M D	Dadeville	Do
Tuscaloosa [1]	A A Kirk M D	Tuscaloosa	Do
Walker	A M Waldrop M D	Jasper	Do
Washington [1]	W A Blake M D	Chatom	Do
Wilcox	F I McIntosh M D	Camden	Do
Winston [1]	J I Mitchell M D	Double Springs	Do
Arizona			
Cochise [1]	O B Moon M D	Bisbee	Director
Coconino [1]	Temporary vacancy	Flagstaff	Do
Maricopa [3]	H I McMartin M D	Phoenix	Do
Yuma	R M Mates M D	Yuma	Do
District [5] Pima Santa Cruz	I H Howard M D	Tucson	Do
Arkansas			
Benton [1]	A W Thompson M D	Bentonville	County medical director
Conway [1]	W P Scarlett M D	Morrilton	Do
Craighead [1]	A C Medelevsky M D	Jonesboro	Do
Crittenden [1]	B M Stevenson M D	Marion	Do
Drew [1]	Albert S J Clarke M D M P H	Monticello	Do
Garland [3]	R F Smallwood M D	Hot Springs	Do
Independence [1]	Ralph F Weddington M D	Batesville	Do
Jackson [1]	M B Owens M D	Newport	Do
Jefferson [1]	Walter H Bruce M D	Pine Bluff	Do
Little Rock [2]	I L Latherree M D M P H	Little Rock	Director
Miller [1]	Mason G Lawson M D M P H	Texarkana	County medical director
Mississippi [1]	Kirk F Mosley M D D P H	Blytheville	Do
Pulaski [1]	J A Summers M D	Little Rock	Do
St Francis [1]	C V Powell M D	Forrest City	Do
Sebastian [3]	J F Johnson M D	Fort Smith	Do
Washington [1]	Neil Compton M D	Fayetteville	Do
White [1]	John L Ruff M D	Searcy	Do

Local health unit	Name of health officer	Post office address	Official title
Arkansas—Con			
District No 1 [5]	Temporary vacancy	Warren	District medical director
Bradley			
Cleveland			
Lincoln			
District No 2 [5]	Chalmers S Pool M D	Hamburg	Do
Ashley			
Chicot			
Desha			
District No 3 [5]	W B Protho M D	Arkadelphia	Do
Clark			
Hempstead			
Nevada			
District No 4 [5]	Max Baldridge, M D	Conway	Do
Cleburne			
Faulkner			
District No 5 [5]	J W Ringgold M D	Ashdown	Do
Howard			
Little River			
Sevier			
District No 7 [5]	R C Kennerly, M D	Camden	Do
Calhoun			
Dallas			
Ouachita			
District No 8 [5]	J T Herron M D	Helena	Do
Lee			
Phillips			
District No 9 [5]	A B Tate M D	Russellville	Do
Johnson			
Pope			
Yell			
District No 10 [5]	Temporary vacancy	Benton	Do
Grant			
Hot Spring			
Saline			
District No 11 [5]	J F Hays M D	Augusta	Do
Cross			
Prairie			
Woodruff			
District No 12 [5]	Temporary vacancy	Walnut Ridge	Do
Clay			
Greene			
Lawrence			
Randolph			
District No 13 [5]	Lynwood B Jones M D	Ozark	Do
Crawford			
Franklin			
Logan			
District No 14 [5]	Temporary vacancy	Marshall	Do
Searcy			
Stone			
Van Buren			
District No 15 [5]	Ulys Jackson M D	Harrison	Do
Boone			
Carroll			
Marion			
Newton			
District No 16 [5]	John W Redman M D	Mt Ida	Do
Montgomery			
Pike			
Scott			
District No 17 [5]	Temporary vacancy	Melbourne	Do
Baxter			
Fulton			
Izard			
Sharp			
California			
Alameda [1]	Ira O Church M D M P H	San Leandro	Health officer.
Berkeley [2]	Frank I Kelly, M D D P H	Berkeley	Do
Contra Costa [1]	William A Powell M D	Martinez	Do
Fresno [2]	Carlton Mathewson M D	Fresno	Do
Fresno [1]	William F Stein M D	do	Do
Imperial [1]	F B Godfrey M D	El Centro	Do
Kern	Joe Smith M D	Bakersfield	Do
Long Beach [2]	G E McDonald M D	Long Beach	Do
Los Angeles [2]	George M Uhl M D, M P H	Los Angeles	Do
Los Angeles [1]	Wilton L Halverson M D D P H	do	Do
Madera [1]	Lee A Stone, M D	Madera	Do.
Monterey [1]	Dwight M Bissell, M D M P H	Salinas	Do.
Oakland [2]	Nolton N Ashley M D	Oakland	Do
Orange [1]	Edward Lee Russell, M D	Santa Ana	Do
Palo Alto [2]	Louis Olsen	Palo Alto	Do

Local health unit	Name of health officer	Post office address	Official title
California—Con			
Pasadena [2]	Charles W Arthur	Pasadena	Acting health officer
Riverside [3]	Warren F Fox M D	Riverside	Health officer
Sacramento [2]	Herbert F True M D	Sacramento	Do
Sacramento [1]	Albert F Zipf M D M P H	do	Do
San Bernardino [1]	Walter W Fenton M D	San Bernardino	Do
San Diego [2]	Alex M Lesem M D	San Diego	Director of health
San Francisco [3]	J C Geiger M D D P H	San Francisco	Health officer
San Joaquin [1]	John J Sippy M D	Stockton	District health officer
San Jose [2]	Henry C Brown M D	San Jose	Health officer
San Luis Obispo [1]	Harrison Filers M D M P H	San Luis Obispo	Do
San Mateo [1]	Charles C Gans M D	Redwood City	Director of health and welfare
Santa Barbara [2]	Clarence T Roome M D	Santa Barbara	Health officer
Santa Barbara [1]	R C Main M D	do	Do
Santa Cruz [1]	John D Fuller M D M P H	Santa Cruz	Do
Solano [3]	George O Brien, M D M P H	Fairfield	Do
Sonoma [1]	John O Raffety M D M P H	Santa Rosa	Do
Stanislaus [3]	F F Reamer M D	Modesto	Do
Tulare [1]	Benj H Viau M D	Visalia	Acting health officer
Ventura [1]	F F Gallison M D M P H	Ventura	Health officer
Yolo [1]	David Frost M D M P H	Woodland	Do
District [5] Sutter Yuba	Irving Johnson M D, M P H	Marysville	Do
Colorado			
El Paso [3]	M F Schafer M D	Colorado Springs	Director
Otero [1]	Lewis H Hoyle M D M P H	La Junta	Do
Weld [1]	William J Wilson M D	Greeley	Do
Connecticut			
Bridgeport [2]	R O B Shea M D M P H	Bridgeport	Health officer
Greenwich [2]	Thomas J Bergin M D	Greenwich	Do
Hamden [2]	Temporary vacancy	Hamden	Do
Hartford [2]	Alfred I Burgdorf M D M P H	Hartford	Do
Middletown [2]	Mario L Palmieri M D M P H	Middletown	Do
Milford [2]	Temporary vacancy	Milford	Do
New Britain [2]	Louis J Dumont M D	New Britain	Do
New Haven [2]	Joseph I Linde M D	New Haven	Do
New London [2]	B N Pennell D V S	New London	Do
Norwalk [2]	Robert I Freeline M D	Norwalk	Do
Stamford [2]	Paul H Brown M D D P H	Stamford	Health commissioner
Waterbury [2]	Edward J Godfrey M D M P H	Waterbury	Health officer
West Hartford [2]	Charles F McPartland M D	West Hartford	Do
Delaware			
Kent [4]	T F Smith M D	Dover	Deputy State health officer
New Castle [4]	J R Downes M D	Newark	Do
Sussex [4]	Maryland B Byrne M D LL B	Georgetown	Do
District of Columbia			
Washington [2]	George C Ruhland M D	Washington	Health officer
Florida			
Baker [1]	D C Witt M D	Macclenny	County health officer
Bay [3]	J O Barfield M D	Panama City	Do
Broward [1]	O W Schwalb M D M P H	Fort Lauderdale	Do
Dade	T E Cato M D C P H	Miami	Do
Duval [1]	K K Waering M D	Jacksonville	Do
Gadsden [1]	S I Ravitch M D	Quincy	Do
Hamilton [1]	R F Sayre M D	Jasper	Do
Hillsboro [1]	W I Sowder M D	Tampa	Do
Jackson [1]	C A Adams Jr M D	Marianna	Do
Jacksonville [2]	N A Upchurch M D	Jacksonville	City health officer
Lake	Jack B Eason M D M S P H	Tavares	County health officer
Leon [3]	L J Graves M D	Tallahassee	Do
Miami [2]	G N MacDonell M D	Miami	City health officer
Monroe [3]	T B Larramore M D	Key West	County health officer
Nassau [1]	George Dame M D	Fernandina	Do
Pinellas [1]	R D Holloweil M D M P H	St Petersburg	Do
Tampa [2]	J R McEachern M D	Tampa	City health officer
Taylor	C A O Quinn M D	Perry	County health officer
Seminole [1]	D N Cone M D	Sanford	Do
St Petersburg [2]	Fred F Kumm M D	St Petersburg	City health officer
District [5] Bradford Clay	Bert R Boone M D	Starke	County health officer
District [5] Escambia Santa Rosa	A L Stebbins M D	Pensacola	Do
District [5] Highlands Glades	L H Dame M D	Sebring	Do

Local health unit	Name of health officer	Post office address	Official title
Florida—Continued.			
District [5]	J. W. McMurray, M. D.	Bronson	County health officer.
Gilchrist			
Levy			
District [5]	W. P. Rice, M. D.	Orlando	Do.
Orange			
Osceola			
District [5]	E. F. Hoffman, M. D., M. S. P. H.	DeFuniak Springs	Do.
Okaloosa			
Walton			
District [5]	R. J. Lamb, M. D.	Apalachicola	Do.
Franklin			
Gulf			
Wakulla			
Georgia:			
Atlanta [7]	J. P. Kennedy, M. D.	Atlanta	Health officer.
Baldwin [1]	Temporary vacancy	Milledgeville	Commissioner of health.
Bartow [1]	do	Cartersville	Do.
Bleckley [1]	do	Cochran	Do.
Brooks [1]	do	Quitman	Do.
Bulloch [1]	O. F. Whitman, M. D., C. P. H.	Statesboro	Do.
Burke [1]	W. D. Lundquist, M. D., C. P. H.	Waynesboro	Do.
Calhoun [1]	Temporary vacancy	Morgan	Do.
Chatham [3]	C. C. Hedges, M. D.	Savannah	Do.
Clarke [3]	W. W. Brown, M. D.	Athens	Do.
Clinch [1]	Temporary vacancy	Homerville	Do.
Cobb [1]	J. E. Lester, M. D.	Marietta	Do.
Coffee [1]	Temporary vacancy	Douglas	Do.
Colquitt [1]	T. H. Chesnutt, M. D.	Moultrie	Do.
Decatur [1]	M. A. Fort, M. D., D. P. H.	Bainbridge	Do.
DeKalb [1]	J. R. Evans, M. D.	Decatur	Do.
Dougherty [1]	W. B. Buckner, M. D., C. P. H.	Albany	Do.
Floyd [1]	B. V. Elmore, M. D.	Rome	Do.
Fulton [1]	R. W. McGee, M. D., C. P. H.	Atlanta	Do.
Grady [1]	H. P. Rankin, M. D.	Cairo	Do.
Greene [1]	J. R. Cain, M. D., M. P. H.	Greensboro	Do.
Hall [1]	W. B. Harrison, M. D., C. P. H.	Gainesville	Do.
Hancock [1]	I. H. Moore, M. D.	Sparta	Director
Jefferson [1]	S. C. Ketchin, M. D., C. P. H.	Louisville	Commissioner of health.
Jenkins [1]	Temporary vacancy	Millen	Do.
Laurens [1]	O. H. Cheek, M. D.	Dublin	Do.
Liberty [1]	H. J. Bush, M. D., M. S.	Hinesville	Health officer.
Lowndes [1]	G. T. Crozier, M. D., D. P. H.	Valdosta	Commissioner of health.
Mitchell [1]	C. O. Rainey, M. D.	Camilla	Do.
Muscogee [3]	J. A. Thrash, M. D., M. P. H.	Columbus	Do.
Richmond [3]	T. B. Phinizy, M. D., M. P. H.	Augusta	Do.
Spalding [3]	T. O. Vinson, M. D., M. P. H.	Griffin	Do.
Sumter [1]	H. T. Adkins, M. D., C. P. H.	Americus	Do.
Terrell [1]	Temporary vacancy	Dawson	Do.
Thomas [1]	H. F. Reddling, M. D.	Thomasville	Do.
Tift [1]	A. G. LeRoy, M. D., C. P. H.	Tifton	Do.
Troup [1]	S. C. Rutland, M. D.	LaGrange	Do.
Walton [1]	Ernest Thompson, M. D., C. P. H.	Monroe	Do.
Ware [1]	G. E. Atwood, M. D., D. P. H.	Waycross	Do.
Washington [1]	O. L. Rogers, M. D.	Sandersville	Do.
Whitfield [1]	C. F. Engelking, M. D., C. P. H.	Dalton	Do.
District [5]	Temporary vacancy	Baxley	Do.
Appling			
Wayne			
District [5]	J. D. Applewhite, M. D., M. P. H.	Macon	Do.
Bibb			
Jones			
District [5]	C. W. Harwell, M. D., C. P. H.	Cordele	Do.
Crisp			
Worth			
District [5]	M. E. Winchester, M. D., B. P. H.	Brunswick	Do.
Camden			
Glynn			
McIntosh			
District [5]	Temporary vacancy	Toccoa	Do.
Habersham			
Rabun			
Stephens			
District [5]	Temporary vacancy	McRae	Do.
Telfair			
Wheeler			
District [5]	P. M. Golley, M. D., C. P. H.	LaFayette	Do.
Catoosa			
Walker			
Northwestern Region [4]	R. B. Griffin, M. D.	Marietta	Medical director.
Bartow			
Carroll			

Local health unit	Name of health officer	Post office address	Official title
Georgia—Continued			
Northwestern Region—Con.			
Catoosa			
Chattooga			
Cherokee			
Cobb			
Dade			
Dawson			
DeKalb			
Douglas			
Fannin			
Floyd			
Forsyth			
Fulton			
Gilmer			
Gordon			
Gwinnett			
Haralson			
Lumpkin			
Murray			
Paulding			
Pickens			
Polk			
Union			
Whitfield			
Walker			
Northeastern Region [4]	R. B. Griffin, M. D.	Gainesville	Medical director
Banks			
Barrow			
Clarke			
Elbert			
Franklin			
Greene			
Habersham			
Hall			
Hart			
Jackson			
Jasper			
Lincoln			
Madison			
Morgan			
Newton			
Oconee			
Oglethorpe			
Putnam			
Rabun			
Rockdale			
Stephens			
Towns			
Walton			
White			
Wilkes			
West Central Region [4]	W. D. Cagle, M. D., C. P. H.	Griffin	Do.
Bibb			
Butts			
Chattahoochee			
Clayton			
Coweta			
Crawford			
Harris			
Heard			
Henry			
Houston			
Fayette			
Jones			
Lamar			
Macon			
Marion			
Meriwether			
Monroe			
Muscogee			
Peach			
Pike			
Schley			
Spalding			
Talbot			
Taylor			
Troup			
Upson			

Local health unit	Name of health officer	Post office address	Official title
Georgia—Continued			
East Central Region [4]	A. J. Davis, M. D., C. P. H.	Swainsboro	Medical director
Baldwin			
Bleckley			
Bulloch			
Burke			
Candler			
Columbia			
Dodge			
Effingham			
Emanuel			
Glascock			
Hancock			
Jefferson			
Jenkins			
Johnson			
Laurens			
McDuffie			
Richmond			
Screven			
Taliaferro			
Treutlen			
Twiggs			
Warren			
Washington			
Wilkinson			
Southwestern Region [4]	Guy V. Rice, M. D., C. P. H.	Albany	Do.
Baker			
Ben Hill			
Berrien			
Brooks			
Calhoun			
Clay			
Colquitt			
Cook			
Crisp			
Decatur			
Dooly			
Dougherty			
Early			
Grady			
Irwin			
Lee			
Lowndes			
Miller			
Mitchell			
Pulaski			
Quitman			
Randolph			
Seminole			
Stewart			
Sumter			
Terrell			
Thomas			
Tift			
Turner			
Webster			
Wilcox			
Worth			
Southeastern Region [4]	J. D. Stillwell, M. D., C. P. H.	Waycross	Do.
Appling			
Atkinson			
Bacon			
Brantley			
Bryan			
Camden			
Chatham			
Charlton			
Clinch			
Coffee			
Echols			
Evans			
Glynn			
Jeff Davis			
Lanier			
Liberty			
Long			
McIntosh			
Montgomery		---	
Pierce		---	
Tattnall		---	
Telfair			

Local health unit	Name of health officer	Post office address	Official title
Georgia Continued			
Southeastern Region [4]—Con			
Toombs			
Ware			
Wayne			
Wheeler			
Idaho			
Ada [3]	Gustavus D Bock M D	Boise	Acting director
Bannock [3]	James V Foley M D M P H	Pocatello	Director
Kootenai [1]	H I Newcombe M D M P H	Coeur d Alene	Do
North Central District [4]	J Campbell Kern M D	Lewiston	Acting director
Clearwater			
Latah			
Nez Perce			
South Central District [4]	Temporary vacancy	Twin Falls	Director
Cassia			
Gooding			
Jerome			
Twin Falls			
Illinois			
Chicago [2]	Herman N Bundesen M D D S C	Chicago	President board of health
Cook	F A Laszczek M D M P H	do	Health officer
Decatur [2]	I A Steele M D	Decatur	Do
Evanston [2]	Winston H Tucker M D Ph D	Evanston	Commissioner of health
Peoria	Sumner M Miller M D	Peoria	Do
Quincy [7]	H O Collins M D	Quincy	Health officer
Rockford [2]	N O Gunderson M D	Rockford	Commissioner of health
Winnetka [2]	Harvard A Orvis M D	Winnetka	Health officer
District [5]	Walter C Earle M D	Champaign	Director
Champaign city			
Urbana city			
East Side District [5]	R C Farrier M D	East St Louis	Health officer
East St Louis city			
East St Louis township			
Centreville township			
Stites township			
District [5]	Arlington Ailes M D	La Salle	Do
La Salle city			
Oglesby city			
Peru city			
District No 1 [4]	F A Tornabene M D M P H	Chicago	District superintendent
DuPage			
Will			
District No 2 [4]	John F Shronts M D M P H D P H	Woodstock	Do
Boone			
Lake			
McHenry			
Winnebago			
District No 3 [4]	A I Barbakoff M D M P H	Freeport	Do
Carroll			
Lee			
Ogle			
Jo Daviess			
Stephenson			
District No 4 [4]	C I Kline M D M P H	Moline	Do
Henry			
Mercer			
Rock Island			
Whiteside			
District No 5 [4]	John P Walsh M D M P H	Aurora	Do
DeKalb			
Grundy			
Kane			
Kendall			
District No 6 [4]	A J Levy M D M P H, D P H	Gilman	Do
Ford			
Iroquois			
Kankakee			
Livingston			
District No 7 [4]	Sandor Horwitz M D	East Peoria	Do
Peoria			
Stark			
Tazewell			
Woodford			

Local health unit	Name of health officer	Post office address	Official title
Illinois—Continued			
District No 8 [4]	Paul G Buss, M D	Macomb	District superintendent
Fulton			
Henderson			
Knox			
McDonough			
Warren			
District No 9 [4]	F L Hill M D, M P H	Mount Sterling	Do
Adams			
Brown			
Hancock			
Pike			
Schuyler			
District No 10 [4]	Jerome J Sievers M D, M P H	Springfield	Do
Cass			
Logan			
Mason			
Menard			
Sangamon			
District No 11 [4]	W M Talbert M D M P H	Decatur	Do
DeWitt			
Macon			
McLean			
Moultrie			
Piatt			
District No 12 [4]	Nettie M Dorris, M D	Paris	Do
Champaign			
Coles			
Douglas			
Edgar			
Vermilion			
District No 13 [4]	John P Crotty M D	Robinson	Do
Clark			
Crawford			
Cumberland			
Jasper			
Lawrence			
Richland			
District No 14 [4]	Temporary vacancy	Pana	Do
Christian			
Effingham			
Fayette			
Montgomery			
Shelby			
District No 15 [4]	Walter J Broad M D M P	Carlinville	Do
Calhoun			
Greene			
Jersey			
Macoupin			
Morgan			
Scott			
District No 16 [4]	W J Menke M D	Highland	Do
Bond			
Clinton			
Madison			
St Clair			
District No 17 [4]	I Bryan M D	Flora	Do
Clay			
Edwards			
Jefferson			
Marion			
Wabash			
Wayne			
District No 18 [4]	Joe H Price M D	McLeansboro	Do
Franklin			
Gallatin			
Hamilton			
Saline			
White			
Williamson			
District No 19 [4]	Roy W Harrell M D	Carbondale	Do
Jackson			
Monroe			
Perry			
Randolph			
Washington			
District No 20 [4]	Temporary vacancy	Vienna	Do
Alexander			
Hardin			
Massac			
Johnson			
Pope			
Pulaski			
Union			

Local health unit	Name of health officer	Post office address	Official title
Illinois—Continued.			
District No. 21 [4]	Merle E. Cosand, M. D.	Peru	District superintendent
Bureau			
LaSalle			
Marshall			
Putnam			
Indiana			
Indianapolis [3]	H G Morgan, M D	Indianapolis	City health officer.
District No. 1 [4]	John D Winebrenner, M D, M. P H.	Princeton	Director
Gibson			
Posey			
Pike			
Warrick			
District No. 2 [4]	Temporary vacancy		Do.
Crawford			
Dubois			
Orange			
Perry			
Spencer			
District No 3 [4]	Maurice Kamp, M D.	New Albany	Acting director
Clark			
Floyd			
Harrison			
Scott			
Washington			
District No 4 [4]	Robert M. Ferguson, M. D.	Rising Sun	Director
Dearborn			
Jefferson			
Ohio			
Ripley			
Switzerland			
District No 6 [4]	D. C Barrett, M D., M P H.	Bloomington	Do.
Brown			
Lawrence			
Martin			
Monroe			
Morgan			
District No 7 [4]	Wendell C Anderson, M D, M P H	LaPorte	Do
LaPorte			
Porter			
Starke			
Iowa			
District No. 1 [4]	Harry H Ennis, M D, C P. H.	Decorah	Do.
Allamakee			
Blackhawk			
Bremer			
Buchanan			
Butler			
Chickasaw			
Clayton			
Fayette			
Howard			
Mitchell			
Winneshiek			
District No 3 [4]	Donald M Harris, M D, M P H	Le Mars	Do
Buena Vista			
Cherokee			
Clay			
Dickinson			
Emmet			
Lyon			
O'Brien			
Osceola			
Palo Alto			
Plymouth			
Sioux			
District No 4 [4]	John A Cowan, M D, C. P H.	Sioux City	Do.
Crawford			
Harrison			
Ida			
Monona			
Shelby			
Woodbury			
District No 5 [4]	F. J. Austin, M. D., M P. H.	Fort Dodge	Do
Audubon			
Boone			
Calhoun			
Carroll			
Greene			
Guthrie			
Hamilton			
Humboldt			
Pocahontas			
Sac			
Webster			

Local health unit	Name of health officer	Post office address	Official title
Iowa—Continued			
District No 6 [4]	Temporary vacancy	Des Moines	Director
Dallas			
Jasper			
Madison			
Marshall			
Polk			
Story			
Warren			
District No 7 [4]	Ruth E Church M D M P H	Washington	Do
Benton			
Iowa			
Johnson			
Keokuk			
Poweshiek			
Tama			
Washington			
District No 8 [4]	C L Putnam M D, C P H	Manchester	Do
Cedar			
Clinton			
Delaware			
Dubuque			
Jones			
Linn			
Jackson			
Scott			
District No 9 [4]	Erwin C Sage M D M P H	Burlington	Do
Des Moines			
Henry			
Jefferson			
Lee			
Louisa			
Muscatine			
Van Buren			
District No 10 [4]	Frank J Condon M D C P H	Centerville	Do
Appanoose			
Clarke			
Davis			
Decatur			
Lucas			
Mahaska			
Marion			
Monroe			
Ringgold			
Union			
Wapello			
Wayne			
District No 11 [4]	Leland Belding M D M P H	Council Bluffs	Do
Adair			
Adams			
Cass			
Fremont			
Mills			
Montgomery			
Page			
Pottawattamie			
Taylor			
Kansas			
Butler	S N Mallison M D	El Dorado	Health officer
Cherokee	J W Spearing M D	Columbus	Do
Geary	Norman A Burkett M D	Junction City	Do
Kansas City [2]	H W Kassel M D	Kansas City	Acting health officer
Lyon	C H Munger M D	Emporia	Health officer
Marion [1]	John W Turner A B M D	Marion	Do
Pratt	F J Beckner M D	Pratt	Do
Riley	Donald E Bux B S M D	Manhattan	Do
Sedgwick [1]	Henry H Asher A B B S M D	Wichita	Do
Shawnee [1]	F F McCord M D	Topeka	Do
Topeka [2]	R J Miller M D	do	Acting health officer
Kentucky			
Bell [3]	J H Wells M D	Pineville	Health officer
Bourbon [1]	George M Jewell M D	Paris	Do
Boyd	R D Higgins M D M P H	Ashland	Do
Bracken [1]	J A Campbell M D	Brooksville	Do
Breathitt [1]	P A Wright M D	Jackson	Do
Calloway [1]	J A Outland M D	Murray	Do
Campbell [1]	C W Shaw M D	Alexandria	Do
Christian [3]	Jack C Haldeman M D	Hopkinsville	Do
Daviess [3]	W G Morgan M D	Owensboro	Do
Estill [1]	R R Snowden M D	Irvine	Do
Fayette [3]	Chas D Cawood M D C P H	Lexington	Do
Fleming [1]	Roy Orsburn M D	Flemingsburg	Do
Floyd [1]	Marvin Ransdell M D M S P H	Prestonsburg	Do

Local health unit	Name of health officer	Post office address	Official title
Kentucky—Con			
Graves[1]	N M Atkins M D	Mayfield	Health officer
Greenup[1]	Temporary vacancy	Greenup	Do
Hardin[1]	C H Blandford M D	Elizabethtown	Do
Harrison[1]	R I Loftin M D	Cynthiana	Do
Henderson[3]	E W Sigler M D C P H	Henderson	Do
Hopkins[1]	C K Morton M D	Madisonville	Do
Jefferson[1]	John D Trawick M D	Louisville	Do
Johnson[1]	F W Kissel M D	Paintsville	Do
Kenton[1]	H C White M D	Covington	Do
Knott[1]	J W Duke M D	Hindman	Do
Letcher[1]	R D Collins M D M P H	Whitesburg	Do
Louisville[2]	Hugh Leavell M D D P H	Louisville	Do
McCracken[3]	C I Reddick M D	Paducah	Do
McCreary[1]	L R McCormack M D	Whitley City	Do
Madison[1]	Max F Blue M D	Richmond	Do
Marshall[1]	S L Henson M D	Benton	Do
Martin[1]	W N Keith M D	Inez	Do
Mason[1]	C W Christine M D	Maysville	Do
Meade[1]	Frank Milton M D	Brandenburg	Do
Menifee[1]	E I Riley M D	Frenchburg	Do
Muhlenberg[1]	G E Brockman M D M S P H	Greenville	Do
Nicholas[1]	D B Thurber M D	Carlisle	Do
Ohio	A D Clark M D	Hartford	Do
Owsley[1]	M E Burton M D	Booneville	Do
Perry[1]	I C Coleman M D C P H	Hazard	Do
Pike[1]	H K Bailey M D M P H	Pikeville	Do
Powell[1]	S I Scrivner M D	Stanton	Do
Pulaski[1]	F A Steiner M D C P H	Somerset	Do
Rockcastle[1]	Walker Owens M D	Mount Vernon	Do
Rowan[1]	T A E Evans M D	Morehead	Do
Scott[1]	A Y Covington M D C P H	Georgetown	Do
Warren[3]	Lewis Fine M D	Bowling Green	Do
Wayne[1]	W R Kelsay M D	Monticello	Do
District[5] Adair Casey	J F Duncan M D M S P H	Columbia	Do
District[5] Allen Barren Monroe	C R Markwood M D M P H	Scottsville	Do
District[5] Anderson Spencer	M H Skaggs M D C P H	Lawrenceburg	Do
District[5] Ballard Carlisle	J E Harrell M D	Wickliffe	Do
District[5] Breckinridge Hancock	P Q Peterson M D	Hardinsburg	Do
District[5] Butler Edmonson	E H John M D	Morgantown	Do
District[5] Carroll Gallatin Trimble	W I Flaherty M D	Carrollton	Do
District[5] Carter Lawrence	Don F Wilder M D	Grayson	Do
District[5] Clay Leslie Jackson	I H Wagers M D C P H	Manchester	Do
District[5] Clinton Cumberland	Paul D Moore M D	Albany	Do
District[5] Crittenden Livingston	James O Nall M D	Marion	Do
District[5] Fulton Hickman	Layson Swann M D	Hickman	Do
District[5] Grant Owen	Wallace Byrd M D	Williamstown	Do
District[5] Grayson Hart	G B Davis M D, M P H	Leitchfield	Do
District[5] Green Metcalfe	H T Carter M D	Greensburg	Do

Local health unit	Name of health officer	Post office address	Official title
Kentucky—Con.			
District [5]	R B Fulks, M D	Barbourville	Health officer
Knox			
Laurel			
Whitley			
District [5]	E C Humphrey M D	Stanford	Do
Lincoln			
Mercer			
District [5]	E M Thompson, M D	Russellville	Do
Logan			
Todd			
District [5]	L A Crosby, M D	Eddyville	Do
Caldwell			
Lyon			
Trigg			
District [5]	J I Cox M D	West Liberty	Do
Morgan			
Wolfe			
District [5]	E B Underwood M D	Morganfield	Do
Union			
Webster			
Louisiana			
Acadia [1]	F A Musacchio M D M P H	Crowley	Parish unit director
Allen	J T May M D	Oberlin	Do
Ascension [1]	I R B Centanni M D	Donaldsonville	Do
Assumption	P M Layn M D	Napoleonville	Do
Avoyelles	L A Breffeilh M D	Marksville	Do
Beauregard [1]	M C Igloe M D M P H	De Ridder	Do
Bienville [1]	J L McConnell M D	Arcadia	Do
Bossier [1]	H N Barnett M D	Benton	Do
Caddo [3]	W J Sandidge M D, C P H	Shreveport	Do
Caldwell [1]	J G Norris M D	Columbia	Do
Claiborne [1]	B L Stinson M D	Homer	Do
Concordia [1]	I H Krauel M D	Vidalia	Do
De Soto	R A Tharp M D	Mansfield	Do
East Baton Rouge [3]	Fred J Macpherson M D M P H	Baton Rouge	Do
East Carroll [1]	F A Williams M D	Lake Providence	Do
Evangeline	Temporary vacancy	Ville Platte	Do
Franklin	R F Applewhite M D	Winnsboro	Do
Grant	Clarence K Walker M D	Colfax	Do
Iberia [1]	Temporary vacancy	New Iberia	Do
Iberville [1]	J Cyril Eby M D	Plaquemine	Do
Jefferson Davis [1]	Francis T Johnson M D	Jennings	Do
Lafayette	A J Comeaux M D	Lafayette	Do
Lafourche	M J Martin M D	Thibodaux	Do
Lincoln	L J Young M D	Ruston	Do
Natchitoches [1]	W W Knipmeyer M D C P H	Natchitoches	Do
Ouachita [1]	G Douglas Williams M D	Monroe	Do
Pointe Coupee [1]	Roy A Kelly M D	New Roads	Do
Rapides	R O C Green M D	Alexandria	Do
Red River [1]	Ben O Morrison M D M P H	Coushatta	Do
Richland [1]	Thomas Burk M D	Rayville	Do
St Charles [1]	C F Durkin M D	Hahnville	Do
St Landry [1]	F V Boyd M D	Opelousas	Do
St Martin [1]	P H Fleming M D	St Martinville	Do
St Mary	G Vasquez M D M P H	Franklin	Do
St Tammany [1]	H E Cannon M D	Covington	Do
Terrebonne	M J Houston M D	Houma	Do
Vernon [1]	Myron J Barker M D	Leesville	Do
Vermilion [1]	Edgar Warren M D	Abbeville	Do
Washington [1]	A J Nicholas M D	Franklinton	Do
Webster	Edmond Klamke M D M P H	Minden	Do
West Carroll [1]	W K Evans, M D	Oak Grove	Do
District [5]	E L Miller M D	Harrisonburg	Do
Catahoula			
La Salle			
District [5]	J D Martin, Jr, M D	Jonesboro	Do
Jackson			
Winn			
District [5]	Charles Reid M D	Tallulah	Do
Madison			
Tensas			
District [5]	N P Iles, M D	Bastrop	Do
Morehouse			
Union			
Northern Region [4]	R P Kandle, M D	Monroe	Director
Bienville			
Bossier			
Caddo			
Caldwell			
Claiborne			
DeSoto			

Local health unit	Name of health officer	Post office address	Official title
Louisiana—Con			
Northern Region—Continued			
East Carroll			
Franklin			
Lincoln			
Madison			
Morehouse			
Ouachita			
Red River			
Richland			
Tensas			
Union			
Webster			
West Carroll			
Central Region [4]	W Carroll Summer M D	Alexandria	Director
Allen			
Avoyelles			
Beauregard			
Catahoula			
Concordia			
Evangeline			
Grant			
LaSalle			
Natchitoches			
Rapides			
Vernon			
Winn			
Southeastern Region [4]	John S Anderson M D	New Orleans	Do
Ascension			
Assumption			
East Baton Rouge			
Iberville			
Lafourche			
Pointe Coupee			
St Charles			
St Tammany			
Terrebonne			
Washington			
Southwestern Region [4]	Ben Freedman M D M P H	Lafayette	Director
Acadia			
Iberia			
Jefferson Davis			
Lafayette			
St Landry			
St Martin			
St Mary			
Vermilion			
Maine			
Auburn [3]	Shirley Davis R N	Auburn	Health officer
Bangor [3]	H D McNeil M D	Bangor	Do
Lewiston [3]	Robert Wiseman Jr M D	Lewiston	Do
Portland [3]	Thomas Letreau M D	Portland	Do
Rumford [3]	Thomas Burr M D	Rumford	Do
Waterville [3]	Arthur Daviau M D	Waterville	Do
District No 1 [4]	J L Pepper M D	South Portland	District health officer
Cumberland			
York			
District No 2 [4]	B L Arms M D	Farmington	Do
Androscoggin			
Franklin			
Oxford			
District No 3 [4]	J W Loughlin M D	Augusta	Do
Kennebec			
Knox			
Lincoln			
Sagadahoc			
Waldo			
District No 4 [4]	C N Stanhope M D	Dover Foxcroft	Do
Penobscot			
Piscataquis			
Somerset			
District No 5 [4]	A H Knapp M D	Machias	Do
Hancock			
Washington			
District No 6 [4]	B F Porter M D	Caribou	Do
Aroostook			
Maryland			
Allegany [3]	J P Franklin M D	Cumberland	County and deputy State health officer
Anne Arundel [1]	W J French M D	Annapolis	Do
Baltimore [1]	W H F Warthen M D M P H	Towson	Do
Calvert [1]	I N King M D	Prince Frederick	Do
Caroline [1]	W B Johnson, M D, M P H	Denton	Do

Local health unit	Name of health officer	Post office address	Official title
Maryland—Con.			
Carroll [1]	W. O. Stone, M. D.	Westminster	County and deputy State health officer.
Cecil [1]	John Collinson, M. D., D P. H.	Elkton	Do.
Charles [1]	D S Fisher, M D.	La Plata	Do
Dorchester [1]	E A Jones, M. D.	Cambridge	Do.
Frederick [1]	E C Kefauver, M D.	Frederick	Do.
Garrett [1]	T. R Shrop, M D.	Oakland	Acting county and deputy State health officer
Harford [1]	T. A. Callahan, M D.	Bel Air	County and deputy State health officer.
Howard [1]	J E Goodpasture, M D.	Ellicott City	Do.
Kent [1]	A F Whitsitt, M D, M P H.	Chestertown	Do.
Montgomery [1]	V L Ellicott, M. D., D. P H.	Rockville.	Do.
Prince Georges [1]	J M Byers, M. D	Upper Marlboro	Do.
Queen Annes [1]	J A McCallum, M D., M P. H.	Centerville	Do.
St Marys [1]	E C Peck, M D, M. P. H.	Leonardtown.	Do.
Somerset [1]	R H. Johnson, M D	Princess Anne	Do.
Talbot [1]	L R Welty, M D, M P H.	Easton	Do.
Washington [1]	W R. Willard, M D, D P H.	Hagerstown	Do.
Wicomico [1]	S H Hurdle, M D, M P. H.	Salisbury	Do.
Worcester [1]	L G Llewelyn, M D.	Pocomoke City	Do.
Massachusetts			
Amesbury [2]	Ralph T Frisbee	Amesbury.	Agent, board of health.
Andover [2]	Lotta Johnson, R N.	Andover	Agent, nurse, board of health.
Arlington [2]	Philip Bower, B S.	Arlington	Agent, board of health.
Barnstable [1]	A P Goff, M. D	Hyannis	County health officer.
Belmont [2]	Keble B Perine, B S., M S.	Belmont	Agent, board of health
Beverly [2]	Thomas H Scanlon	Beverly	Clerk, agent, board of health
Boston [2]	Lynde Gately, M D.	Boston	Health commissioner.
Braintree [2]	C Johnson	Braintree.	Health officer.
Brockton [2]	Eli Perrault	Brockton	Do.
Brookline [2]	Francis P Denny, M D.	Brookline	Do.
Chelsea [2]	John F Welch, A B.	Chelsea	Do.
Chicopee [2]	Paul G Martel	Chicopee	Agent, board of health.
Clinton [2]	Frederick E Murphy	Clinton	Health officer.
Danvers [2]	Hugo Nappo	Danvers	Do.
Everett [2]	William F Hogan	Everett.	Agent, board of health.
Fall River [2]	Arthur J Ledoux, M D.	Fall River	Health commissioner.
Fitchburg [2]	Fred R Brigham	Fitchburg	Health officer.
Framingham [2]	David Moxon, B S., C P H.	Framingham	Agent, board of health.
Franklin [2]	John Riley	Franklin	Do.
Gardner [2]	W P O'Donnell.	Gardner	Do
Gloucester [2]	Patrick E Curley.	Gloucester	Sanitary, milk inspector
Greenfield [2]	George P Moore	Greenfield	Health agent.
Haverhill [2]	Frederick W Morse	Haverhill	Agent, board of health.
Hingham [2]	E J Carroll, A B.	Hingham	Health officer
Holyoke [2]	Daniel P. Hartnett, Ph G	Holyoke	Agent and health officer
Ipswich [2]	Eben B Moulton	Ipswich.	Agent, board of health, milk inspector.
Lawrence [2]	Daniel J Costello.	Lawrence	Clerk, board of health.
Leominster [2]	Hugh E. Crain	Leominster.	Agent, board of health.
Lowell [2]	John J. McNamara, M. D, S. E.	Lowell	Director of health and school hygiene.
Malden [2]	May C Welsh	Malden	Clerk, agent, board of health
Marblehead [2]	Everett R Thompson.	Marblehead	Agent, board of health, milk inspector.
Marlborough [2]	Mary O'Connell, R. N	Marlborough.	Agent, nurse.
Needham [2]	G Donald Buckner, S B.	Needham	Health officer.
New Bedford [2]	Archibald N. Senesac, M. D.	New Bedford	Agent, medical inspector
Newburyport [2]	Wilbur N. O'Brien, Ph. G.	Newburyport	Agent, board of health, milk inspector.
Newton [2]	Ernest M. Morris, M. D., M. P. H	Newton	Director of health.
North Adams [2]	Harry B Franchere, M. D.	North Adams.	Health officer.
North Andover [2]	L. P. Kathan, R. N.	North Andover	Agent, board of health, milk inspector.
Peabody [2]	Percy F. Murray	Peabody	Agent, board of health.
Pittsfield [2]	Temporary vacancy.	Pittsfield	Do
Quincy [2]	Howard E Porter	Quincy	Agent, health department.
Revere [2]	Patrick C Bruno	Revere.	Health officer, milk inspector
Salem [2]	John J. McGrath	Salem	Agent, board of health, milk inspector.
Saugus [2]	Charles Wilson	Saugus	Do.
Southborough [2]	Margaret Houle, R. N.	Southborough	Agent, nurse.
Springfield [2]	L. J. Smith, M. D.	Springfield	Commissioner of health.

Local health unit	Name of health officer	Post office address	Official title
Massachusetts—Con.			
Stoneham [2]	Gordon F May	Stoneham	Agent and clerk, board of health
Swampscott [2]	Clarence W Horton	Swampscott	Health officer, milk inspector
Waltham [2]	Joseph T Mulcahy, LL B	Waltham	Director of welfare
Watertown [2]	John A Colbert	Watertown	Health officer and agent, board of health
Webster [2]	Marion Kleczka, R N	Webster	Agent, nurse
West Springfield [2]	Charles H Mace, Jr	West Springfield	Agent, board of health.
Winchester [2]	Roger M Burgoyne, M D	Winchester	Agent and clerk, board of health
Winthrop [2]	William A Childress	Winthrop	Agent, milk inspector.
Woburn [2]	Edward F Gorman	Woburn	Agent and secretary, board of health
Worcester [2]	Temporary vacancy	Worcester	
District No 1 [4]	Harold W Stevens, M D	Middleborough	State district health officer
Barnstable			
Bristol (excluding 1 township)			
Norfolk (1 township)			
Plymouth (excluding 11 townships)			
District No 2 [4]	Henry M DeWolfe, M D	Braintree	Do.
Bristol (1 township)			
Middlesex (6 townships)			
Norfolk (excluding 3 townships)			
Plymouth (11 townships)			
District No 3 [4]	Vlado A Getting, M D	Boston	Do
Middlesex (25 townships)			
Norfolk (2 townships)			
District No 4 [4]	Robert E Archibald, M D	Boston	Do.
Essex			
Middlesex (16 townships)			
District No 5 [4]	Oscar A Dudley, M D	Worcester	Do.
Worcester (excluding 6 townships and the Nashoba district)			
District No 6 [4]	Charles E Gill, M D	Westfield	Do.
Hampshire (excluding 4 townships)			
Hampton			
District No 7 [4]	Walter W Lee	Greenfield	Do.
Franklin			
Hampshire (4 townships)			
Worcester (6 townships)			
District No 8 [4]	Morris Taylor, M D	Pittsfield	Do.
Berkshire			
Nashoba District [4]	James O Wails, M D	Ayer	Medical director.
Middlesex (7 townships)			
Worcester (3 townships).			
Michigan			
Allegan [1]	M B Beckett, M D, C P H	Allegan	Director
Ann Arbor [2]	J A Wessinger, M D	Ann Arbor	Health officer.
Barry [1]	J K Altland, M D, M S P H	Hastings	Director
Battle Creek [2]	A A Hoyt, M D	Battle Creek	Health officer
Bay [1]	F T Andrews, M D	Bay City	Director
Bay City [2]	Robert F Hall, M D, M S P. H	do	Health officer.
Branch [1]	R B Harkness, M D	Coldwater	Acting director.
Calhoun [1]	Hugh Robins, M D	Marshall	Director
Cass [1]	L W Switzer, M D	Cassopolis	Do
Chippewa [1]	David Littlejohn, M D, D P H	Sault Ste Marie	Do
Delta [1]	Fred O Tonney, M D	Escanaba	Do
Detroit [2]	Bruce H Douglas, M D	Detroit	Commissioner
Dickinson [1]	Alexander Witkow, M D, M P H	Iron Mountain	Director.
Eaton [1]	George C Stucky, M D	Charlotte	Do
Flint [2]	George Hays, M. D	Flint	Executive health officer.

Local health unit	Name of health officer	Post office address	Official title
Michigan—Con.			
Genesee [1]	L V Burkett, M. D	Flint	Director.
Grand Rapids [2]	C C Slemons, M D., D P H	Grand Rapids	City health officer.
Grand Traverse [1]	B H. Van Leuven, M. D	Traverse City	Director.
Hillsdale [1]	J P Gray, M D, M. P. H	Hillsdale	Do.
Ingham [1]	C D Barrett, M. D., C. P. H	Mason	Do.
Iron [1]	L C Bate, M D	Stambaugh	Do.
Isabella [1]	F R Town, M D	Mt Pleasant	Do.
Jackson [2]	E J MacLachlan, D V M	Jackson	City health officer.
Kalamazoo [3]	I W Brown, M D., M. P. H	Kalamazoo	Director.
Kent [1]	J D. Brook, M D	Grand Rapids	Do
Lansing [2]	E R Vander Slice, M D	Lansing	City health officer.
Marquette [2]	C. P. Drury, M D	Marquette	Do
Menominee [1]	C C Corkill, M D, M P H	Menominee	Director.
Midland [1]	Ralph R Sachs, M. D	Midland	Do.
Muskegon [3]	Richard Sears, M D., M. S. P. H	Muskegon	Do.
Oakland [3]	J D Monroe, M D	Pontiac	Do.
Ottawa [1]	Ralph Ten Have, M. D., C. P. H	Grand Haven	Do.
Pontiac [2]	C A Neafie, M D, M S P. H.	Pontiac	City health officer.
Saginaw [2]	F A Poole, M D	Saginaw	Do.
Saginaw [1]	V K Volk, M D, D P H	do	Director.
Sanilac [1]	Vida H Gordon, M D, M P H	Sandusky	Do.
Shiawassee [1]	T E Camper, M D	Corunna	Do.
St Joseph [1]	Lawrence A Berg, M D, M P H	St Joseph	Do.
Van Buren [1]	M R French, M D	Paw Paw	Do.
Washtenaw [1]	Otto K Engelke, M D, M. S P. H	Ann Arbor	Do.
Wexford [1]	S C Moore, M D	Cadillac	Do.
District No 1 [5]	T R Laughbaum, M. D	Lake City	Do.
Crawford			
Kalkaska			
Missaukee			
Roscommon			
District No 2 [5]	Sue H Thompson, M. D, C P H	West Branch	Do.
Alcona			
Iosco			
Ogemaw			
Oscoda			
District No 3 [5]	James Chapman, M D	Charlevoix	Do.
Antrim			
Charlevoix			
Emmet			
Otsego			
District No 4 [5]	Gordon B. Moffatt, M. D., D. P. H.	Rogers City	Do.
Alpena			
Cheboygan			
Montmorency			
Presque Isle			
District No 5 [5]	Albert C. Edwards, M. D, M. P H.	White Cloud	Do.
Lake			
Newaygo			
Oceana			
District No 6 [5]	Sidney I Franklin, M. D, M S P H	Newberry	Do.
Luce			
Mackinac			
District No 7 [5]	Helen Lanting, M D, M S P H.	Gladwin	Acting director.
Arenac			
Clare			
Gladwin			
District [5]	E J. Brenner, M. D	Manistique	Director.
Alger			
Schoolcraft			
District [5]	Russell E. Pleune, M D, M P H	Houghton	Do.
Houghton			
Keweenaw			
District [5]	Paul A. Lindquist, M. D., M S. P. H.	Manistee	Do.
Benzie			
Manistee			
Mason			
District [5]	Clifton Hall, M. D, M P. H	Big Rapids	Do.
Mecosta			
Osceola			
District [5]	R J Shale, M. D., M. S. P. H	Ontonagon	Do.
Baraga			
Ontonagon			
Minnesota			
Duluth [2]	M McC Fischer, M. D	Duluth	Do.
Minneapolis [2]	F E Harrington, M D	Minneapolis	Commissioner.
Rochester [2]	F M. Feldman, M. D., D. P. H.	Rochester	City health officer.
St Paul [2]	R. B J. Schoch, M. D	St. Paul	Do.

Local health unit	Name of health officer	Post office address	Official title
Minnesota—Con.			
District No 1 [4]	J. R. Kingston, M. D, M. P. H	Bemidji	Director.
Beltrami			
Clearwater			
Hubbard			
Itasca			
Koochiching			
District No. 2 [4]	F. W. Engdahl, M. D	Mankato	Do.
Blue Earth			
Brown			
Faribault			
Freeborn			
Jackson			
LeSueur			
Martin			
Nicollet			
Sibley			
Steele			
Waseca			
Watonwan			
District No 3 [4]	Lester Breslow, M. D., M P. H	Rochester	Do.
Dodge			
Fillmore			
Goodhue			
Houston			
Mower			
Olmsted			
Wabasha			
Winona			
District No. 4 [4]	C. A. Scherer, M. D	Duluth	Do.
Carlton			
Cook			
St Louis			
Mississippi.			
Adams [3]	A. L. Adam, M D	Natchez	Do.
Alcorn [1]	R. H. DeJarnette, M. D., M. P. H	Corinth	Do.
Amite [1]	J. F. Bradley, M D	Liberty	Do.
Bolivar [1]	R D. Dedwylder, M D	Cleveland	Do.
Chickasaw [1]	J. W. Dugger, M D	Houston	Acting director.
Claiborne [1]	R F Mayer, M D	Port Gibson	Director.
Coahoma [3]	Guy R Post, M D, C. P. H	Clarksdale	Do.
Copiah [1]	J. C McGuire, M. D	Hazelhurst	Do.
DeSoto [1]	Arthur Vandergrift, M D	Hernando	Do
Forrest [3]	B. D Blackwelder, M. D., C. P H	Hattiesburg	Do.
Hancock [1]	C M Shipp, M D	Bay St Louis	Do.
Harrison [1]	E. W Ryan, M D	Gulfport	Do.
Hinds [3]	W. E Noblin, M D	Jackson	Do.
Holmes [1]	L. H. Eubanks, M D	Lexington	Do
Humphreys [1]	J. W Barkley, M D	Belzoni	Do
Jackson [1]	A T. Nadeau, Jr., M. D	Pascagoula	Do.
Jones [3]	T Paul Haney, M. D., C. P. H., D P H	Laurel	Do.
Kemper [1]	J R Priest, M. D	DeKalb	Do.
Lafayette [1]	Victor P Genge, M. D	Oxford	Do.
Lamar [1]	J N Mason, M D	Purvis	Do.
Lauderdale [3]	N. C Knight, M D, C. P. H	Meridian	Do.
Lee [1]	W H Cleveland, M D	Tupelo	Do.
Leflore [3]	R J Jones, M D, M P H	Greenwood	Do
Lincoln [1]	W. R May, M D, C. P H	Brookhaven	Do
Lowndes [3]	J H. White, M D	Columbus	Do.
Madison [1]	J. H Hines, M D	Canton	Do.
Marion [1]	J. A Sproles, M D	Columbia	Do.
Marshall [1]	J G Young, M D	Holly Springs	Do.
Monroe [1]	C. H Love, M D	Aberdeen	Do.
Noxubee [1]	George F Gibbons, M D	Macon	Do.
Panola [1]	George B Neukom, M. D	Batesville	Do
Pearl River [1]	R L. Simmons, M D	Poplarville	Do.
Pike [1]	Sidney J. Williams, M. D., C. P H	McComb	Do
Prentiss [1]	John C Powell, M D	Booneville	Do.
Rankin [1]	H B Cottrell, M. D, C. P. H	Brandon	Acting director.
Simpson [1]	J G Egger, M D	Mendenhall	Director.
Sunflower [1]	Andrew Hedmeg, M D, M. P. H	Indianola	Do.
Tallahatchie [1]	J. M Campbell, M D	Charleston	Do.
Tate [1]	H H Rutledge, M D	Senatobia	Do
Tishomingo [1]	W R Armstrong, M D	Iuka	Do.
Tunica [1]	T K Chandler, M D	Tunica	Do.
Union [1]	R H Bostwick, M D	New Albany	Do.
Warren [3]	F Michael Smith, M D	Vicksburg	Do.
Washington [3]	J P. Ward, M. D, M P. H	Greenville	Do
Yazoo [1]	J E Sandness, M D	Yazoo City	Acting director.
District [3]	R. L. Wyatt, M D	Shubuta	Director.
Clarke			
Wayne			

Local health unit	Name of health officer	Post office address	Official title
Mississippi—Con.			
District [5]	W. F. Bell, M. D	Bay Springs	Director.
Jasper			
Smith			
District [5]	B. A. Stafford, M. D	Rolling Fork	Do.
Sharkey			
Issaquena			
Southeastern District [5]	Edwin H. West, M. D	Lucedale	Do.
George			
Greene			
Perry			
Stone			
District [5]	A. A. Aden, M. D	Ripley	Do.
Benton			
Tippah			
District [5]	E. J. Holder, M. D	Prentiss	Do.
Covington			
Jefferson Davis			
Lawrence			
Missouri			
Cass [1]	E. M. Griffith, M. D	Harrisonville	Health officer.
Greene [1]	J. R. Amos, M. D	Springfield	Do.
Jackson [1]	W. F. McCarthy, M. D	Independence	Do.
Jasper [1]	C. W. Meinershagen, M. D	Webb City	Do.
Laclede [1]	H. S. Wolanczyk, M. D	Lebanon	Do.
Marion [3]	E. M. Lucke, M. D	Hannibal	Do.
Miller [1]	M. J. Ayres, M. D	Tuscumbia	Do.
Pemiscot [1]	Fred Ogilvie, M. D	Caruthersville	Do.
Phelps [1]	L. F. Weyerich, M. D	Rolla	Do.
Platte [1]	E. W. Cline, M. D	Platte City	Do.
Pulaski [1]	Carl Weissmann, M. D	Waynesville	Do.
St. Louis [1]	E. G. McGavran, M. D., M. P. H	Clayton	Do.
Texas [1]	Robert J. Anderson, M. D	Houston	Do.
District No. 2 [4]	H. S. Miller, M. D	Dexter	Do.
Butler			
Dunklin			
Mississippi			
New Madrid			
Scott			
Stoddard			
District No. 4 [4]	T. L. Waddle, M. D	Fredericktown	Do.
Bollinger			
Cape Girardeau			
Iron			
Madison			
Perry			
St. Genevieve			
St. Francois			
Washington			
Wayne			
District No. 5 [4]	S. B. Beecher, M. D	Salem	Do.
Carter			
Crawford			
Dent			
Howell			
Oregon			
Reynolds			
Ripley			
Shannon			
Texas			
District No. 6 [4]	E. C. Kienzle, M. D	Monett	Do.
Barry			
Barton			
Christian			
Dade			
Douglas			
Lawrence			
McDonald			
Newton			
Ozark			
Stone			
Taney			
Webster			
Wright			
District No. 7 [4]	A. D. Johnston, M. D	Osceola	Do.
Bates			
Benton			
Camden			
Cedar			
Dallas			
Henry			
Hickory			
Laclede			
Morgan			

Local health unit	Name of health officer	Post office address	Official title
Missouri—Continued			
District No. 7—Con.			
Polk			
St Clair			
Vernon			
District No 8 [4]	L M Garner, M. D	Higginsville	Health officer.
Carroll			
Chariton			
Clay			
Cooper			
Howard			
Johnson			
LaFayette			
Pettis			
Ray			
Saline			
District No 9 [4]	D. A. Campbell, M. D	Owensville	Do.
Boone			
Calloway			
Cole			
Franklin			
Gasconade			
Jefferson			
Lincoln			
Maries			
Moniteau			
Montgomery			
Osage			
St Charles			
Warren			
District No 10 [4]	E Val Davis, M D	Kirksville	Do.
Adair			
Audrain			
Clark			
Knox			
Lewis			
Macon			
Monroe			
Pike			
Putnam			
Ralls			
Randolph			
Schuyler			
Scotland			
Shelby			
Sullivan			
District No 11 [4]	R L Strobach, M D	Cameron	Do.
Andrew			
Atchison			
Caldwell			
Clinton			
Davies			
DeKalb			
Gentry			
Grundy			
Harrison			
Holt			
Linn			
Livingston			
Mercer			
Nodaway			
Platte			
Worth			
Montana			
Cascade [3]	H V. Gibson, M D	Great Falls	City-county health officer
Fergus [1]	C. C. Wallin, M D	Lewistown	Health officer
Gallatin [1]	A. D. Brewer, M D	Bozeman	Do
Lewis and Clark [3]	L F. Hall, M D	Helena	Do
Missoula [3]	F D. Pease, M D	Missoula	Do.
Nebraska			
Douglas [3]	S L Pearlman, M. D., Ph. B, M S. P H	Omaha	Director of communicable disease
District [4]	L E. Kling, M. D., D N. B	Bellevue	Director.
Cass			
Sarpy			
Nevada			
Clark [3]	Ernest Newman, M. D, M. P. H.	Las Vegas	Health officer
New Hampshire			
Berlin [2]	Ernest Pederson	Berlin	Do
Concord [2]	Walter C Rowe, M. D	Concord	Acting health officer.
Keene [2]	Evan C White	Keene	Health officer.
Manchester [2]	Howard Streeter, M D	Manchester	Do.
Nashua [2]	Leon A. Sylvestre	Nashua	Do.

Local health unit	Name of health officer	Post office address	Official title
New Jersey			
Belleville [2]	Eugene T Berry	Belleville	Health officer
Bloomfield [2]	Charles T Faulk	Bloomfield	Do
Bridgeton [2]	John Robbins	Bridgeton	Do
Burlington [2]	J Margaret Warner	Burlington	Do
Camden [2]	A T Stone M D	Camden	Do
Carteret [2]	Michael Yarcheski	Carteret	Do
East Orange [2]	Frank J Osborne	East Orange	Do
Elizabeth [2]	Louis J Richards	Elizabeth	Do
Englewood [2]	Hugh B Martin	Englewood	Do
Franklin [2]	Cora Glynn	Franklin	Do
Glen Ridge [2]	Otto B Schalk	Glen Ridge	Do
Hackensack [2]	L Van D Chandler	Hackensack	Do
Hamilton [2]	N G Maddux	Trenton	Executive officer
Harrison [2]	John T McClure	Harrison	Health officer
Hillside [2]	Samuel M Jowitt	Hillside	Do
Irvington [2]	William S Bailey	Irvington	Do
Jersey City [2]	Dennis Sullivan	Jersey City	Do
Kearny [2]	Amos Field Jr	Kearny	Do
Lakewood [2]	Grace I Margerum	Lakewood	Supervisor
Linden [2]	M E N[illegible]	Linden	Health officer
Lyndhurst [2]	John T McGarry	Lyndhurst	Do
Madison [2]	Isaac M Noe	Madison	Executive officer
Maplewood [2]	Marie Harrison	Maplewood	Health officer
Merchantville [2]	Fred C Metzger	Merchantville	Do
Montclair [2]	Carl T Pomeroy	Montclair	Do
Morris [2]	David R O'Keefe	Morristown	Do
Morristown [2]	John F Kilkenny	do	Do
Neptune [2]	William S Applegate	Neptune	Do
Newark [2]	Charles V Craster M D	Newark	Do
North Bergen [2]	Edward Cumiskey	North Bergen	Do
Nutley [2]	Richard V Fellers	Nutley	Do
Ocean City [2]	Harold W Hager	Ocean City	Do
Orange [2]	W M Brien M D	Orange	Do
Paterson [2]	F P Lee M D	Paterson	Do
Perth Amboy [2]	Charles Thompson D V M	Perth Amboy	Do
Plainfield [2]	Andrew J Krog	Plainfield	Do
Princeton [2]	William C Blake	Princeton	Do
Rahway [2]	Fred M Williams	Rahway	Do
Rutherford [2]	Marine Dunn	Rutherford	Do
Trenton [2]	A S Fell M D	Trenton	Do
Westfield [2]	Andrew Carney	Westfield	Eexecutive officer
West New York [2]	Robert S Genduso	West New York	Health officer
Monmouth Health Unit No 1 [4] Monmouth (5 municipalities)	Budd H Obert	Asbury Park	Do
Monmouth Health Unit No 2 [4] Monmouth (6 municipalities)	J F Emmons	Long Branch	Acting health officer
Union Health Unit No 1 [4] Union (3 municipalities)	Percy de Stanley M D	Union	Health officer
Union Health Unit No 2 [4] Union (4 municipalities)	William J Willsey	Cranford	Do
Fort Dix Regional Unit [4] Burlington (7 municipalities)	A L Chapman, M D	Cookstown	Do
District No 1 [4] Morris Sussex Warren	H R H Nicholas	Dover	Do
*District No 2 [4] Bergen Passaic (excluding Paterson city)	C R Newell	Hackensack	Do
District No 3 [4] Hunterdon Middlesex (17 municipalities Somerset	A B Rosenberg M D	Trenton	Do
District No 4 [4] Middlesex ([illegible] municipalities) Monmouth Ocean (21 municipalities)	D C Bowen	Freehold	Do

Local health unit	Name of health officer	Post office address	Official title
New Jersey—Con.			
District No. 5 [4]	Harry F. Leeds	Pitman	Health officer.
Camden (excluding Camden city).			
Cumberland			
Gloucester			
District No. 6 [4]	N. E Newbury, M. D	Mays Landing	Do.
Atlantic			
Cape May			
Ocean (13 municipalities)			
District No 7 [4]	R. C Strode, M. D	Mount Holly	Do.
Burlington (excluding Fort Dix unit and 1 township).			
New Mexico			
District No 1 [5]	Paul G Capps, M. D	Santa Fe	District health officer.
Rio Arriba			
Santa Fe			
Taos			
District No 2 [5]	E B Beaver, M. D	Gallup	Do.
McKinley			
San Juan			
District No 3 [5]	A R Clauser, B S, M. D, M S. P. H.	Albuquerque	Do.
Bernalillo			
Sandoval			
District No 4 [5]	O. W. Gerber, M. D	Las Cruces	Do.
Dona Ana			
Lincoln			
Otero			
Sierra			
District No 5 [5]	Harrison Eilers, A B., M D., C P. H.	Las Vegas	Do.
Guadalupe			
Mora			
San Miguel			
District No. 6 [5]	O. E Puckett, M D	Las Cruces	Do.
Chaves			
Eddy			
Lea			
District No. 7 [5]	John C. Mitchell, A. B., M D., C. P. H.	Silver City	Do.
Grant			
Hidalgo			
Luna			
District No 8 [5]	W. Drummond Radcliffe, M. D., A. B., C. P. H	Los Lunas	Do.
Catron			
Socorro			
Torrance			
Valencia			
District No 9 [5]	F C. Diver, M. D	Raton	Do.
Colfax			
Harding			
Union			
District No 10 [5]	R. H. Wilson, M. D	Clovis	Do.
Curry			
DeBaca			
Quay			
Roosevelt			
New York			
Albany [2]	Daniel V O'Leary, M. D	Albany	Health officer.
Binghamton [2]	Chalmers J Longstreet, M D	Binghamton	Do.
Buffalo [2]	Francis E. Fronczak, M. D	Buffalo	Health commissioner.
Cattaraugus [3]	Wendell R. Ames, M D., C. P H	Olean	Do.
Columbia [3]	Wilford L. J. McDonald, M. D., C P. H.	Hudson	Do.
Cortland [3]	William E. Mosher, Jr., M. D., M P. H.	Cortland	Do.
Glens Falls [2]	Virgil D. Selleck, M. D	Glens Falls	Health officer.
Ithaca [2]	Robert H Broad, M. D., M. P. H.	Ithaca	Health officer, school physician.
Mount Vernon [2]	Theodore A. Jost, M. D., M. P. H.	Mount Vernon	Commissioner of health.
Nassau [3]	Earle G. Brown, M. D	Mineola	Do.
New Rochelle [2]	Joseph H. Kinnaman, M. D	New Rochelle	Director
Niagara Falls [2]	Edward E. Gilleck, M. D	Niagara Falls	Health officer.
New York [2]	John L. Rice, M. D	New York	Commissioner of health.
Poughkeepsie [2]	William H. Conger, M D	Poughkeepsie	Health officer.
Rochester [2]	Arthur M. Johnson, M. D	Rochester	Do.

Local health unit	Name of health officer	Post office address	Official title
New York—Con.			
Schenectady [2]	William C. Treder, M. D.	Schenectady	Commissioner of health.
Suffolk [1]	Arthur T. Davis, M. D.	Riverhead	Health commissioner.
Syracuse [2]	H. Burton Doust, M. D.	Syracuse	Commissioner of health
Utica [2]	Hugh H. Shaw, M. D., C. P. H.	Utica	Health officer
Westchester [3]	George H. Ramsey, M. D., D. P. H.	White Plains	Health commissioner.
Yonkers [2]	Eugene F. McGillian, M. D., M. A. P. H.	Yonkers	Commissioner of health
District [4]	Frank E. Coughlin, M. D., D. P. H.	Albany	District State health officer.
Albany			
Columbia			
Rensselaer			
Schenectady			
District [4]	Daniel P. McMahon, M. D., M. P. H.	Amsterdam	Do.
Fulton			
Montgomery			
District [4]	Ralph M. Vincent, M. D., M. P. H.	Binghamton	Do.
Broome			
Chenango			
Tioga			
District [4]	Archibald S. Dean, M. D., D. P. H.	Buffalo	Do.
Erie			
Niagara			
Subdistrict	Gordon R. Gray, M. D., C. P. H.	Batavia	Assistant officer
Genesee			
Orleans			
Wyoming			
Subdistrict	Robert L. Vought, M. D., C. P. H.	Jamestown	Do.
Cattaraugus			
Chautauqua			
District [4]	Don M. Griswold, M. D., D. P. H.	Geneva	District State health officer.
Ontario			
Seneca			
Yates			
District [4]	Burke Diefendorf, M. D.	Glens Falls	Do.
Saratoga			
Warren			
Washington			
District [4]	Stanley W. Sayer, M. D.	Gouverneur	Do.
Jefferson			
Lewis			
St. Lawrence			
District [4]	John A. Conway, M. D.	Hornell	Do.
Allegany			
Chemung			
Steuben			
District [4]	Raymond D. Fear, M. D., D. P. H.	Ithaca	Do.
Schuyler			
Tompkins			
District [4]	Hollis S. Ingraham, M. D., M. P. H.	Kingston	Do.
Greene			
Ulster			
District [4]	Harry L. Chant, M. D., C. P. H.	Middletown	Do.
Orange			
Rockland			
Sullivan			
District [4]	Philip J. Rafle, M. D., C. P. H.	New York	Do.
Nassau			
Suffolk			
Westchester			
District [4]	Ray D. Champlin, M. D., C. P. H.	Oneonta	Do.
Delaware			
Otsego			
Schoharie			
District [4]	Bertrand E. Roberts, M. D.	Poughkeepsie	Do.
Dutchess			
Putnam			
District [4]	Paul A. Lembcke, M. D., C. P. H.	Rochester	Do.
Livingston			
Monroe			
Wayne			
District [4]	Joseph P. Garen, M. D., C. P. H.	Saranac Lake	Do.
Clinton			
Essex			
Franklin			
Hamilton			

Local health unit	Name of health officer	Post office address	Official title
New York—Con			
District [4]	Edward B Bukowski M D, D P H	Syracuse	Acting district State health officer
Cayuga			
Cortland			
Onondaga			
Oswego			
District [4]	Samuel Hyman M D, C P H	Utica	District State health officer
Herkimer			
Madison			
Oneida			
North Carolina			
Alamance [1]	Phares Yates Greene M D	Graham	County health officer
Anson [1]	Loren Wallin M D	Wadesboro	Do
Asheville [2]	Margery J Lord M D	Asheville	City health officer
Beaufort [1]	D F Ford M D	Washington	County health officer
Bladen [1]	Robert S Cromartie M D	Elizabethtown	Do
Buncombe [1]	Wilfred N Sisk M D M P H	Asheville	Do
Cabarrus [3]	M B Bethel M D M P H	Concord	Do
Carteret [1]	Charles Paul Stevick M D	Beaufort	Do
Charlotte [2]	Greene Lee Rea M D	Charlotte	City health officer
Cleveland [1]	Z P Mitchell M D	Shelby	County health officer
Columbus [1]	Floyd Johnson M D	Whiteville	Do
Craven [3]	Robert Sherwood McGeachy M D	New Bern	Do
Cumberland [3]	Malcolm Tennyson Foster M D M P H	Fayetteville	Do
Davidson [3]	Grover Cleveland Gambrell, M D	Lexington	Do
Duplin [1]	Temporary vacancy	Kenansville	Do
Durham [3]	J H Epperson M S	Durham	Superintendent of health
Edgecombe [1]	William K McDowell M D	Tarboro	County health officer
Franklin [1]	Richard F Yarborough M D	Louisburg	Do
Gaston [1]	Robert Edgar Rhyne M D	Gastonia	Do
Granville [1]	Ballard Norwood M D	Oxford	Do
Greensboro [2]	C Curtis Hudson M D	Greensboro	City health officer
Guilford [1]	Roderick Mark Buie M D	do	County health officer
Halifax [1]	Robert I Young M D	Halifax	Do
Harnett [1]	William Blair Hunter M D	Lillington	Do
High Point [2]	Robert Alexander Herring M D	High Point	City health officer
Johnston	Edward S Grady M D	Smithfield	Do
Lenoir	Zebulon Vance Mosley M D	Kinston	Do
Martin	John W Williams M D M P H	Williamston	Do
Mecklenburg [1]	Elmar Hall Hand M D	Charlotte	Do
Moore [1]	Benjamin M Drake M D	Carthage	Do
Nash [1]	Thomas Oliver Coppedge M D	Nashville	Do
New Hanover [3]	Avon Hall Elliot M D	Wilmington	Do
Northampton [1]	W Raleigh Parker M D	Jackson	Do
Pitt [3]	N Thomas Ennett M D	Greenville	Do
Randolph [1]	George Herbert Sumner M D M P H	Asheboro	Do
Richmond [1]	Temporary vacancy	Rockingham	Do
Robeson [1]	Eugene Ramsey Hardin M D	Lumberton	Do
Rockingham [1]	Douglas H Fryer M D D P H	Leaksville	Do
Rocky Mount [2]	James Allen Whitaker M D	Rocky Mount	City health officer
Rowan	Charles W Armstrong M D	Salisbury	County health officer
Sampson [1]	Jabez H Williams M D	Clinton	Do
Stanly [1]	Wayland Nash McKenzie M D	Albemarle	Do
Surry [1]	R B C Franklin M D	Mount Airy	Do
Union [1]	Clem Ham M D	Monroe	Do
Vance [1]	Alfred D Gregg M D	Henderson	Do
Wake [3]	Alexander C Bulla M D	Raleigh	Do
Wayne [3]	Samuel B McPheeters M D	Goldsboro	Do
Wilkes [1]	A J Eller M D	Wilkesboro	Do
Wilson [3]	Wade Hampton Anderson M D	Wilson	Do
Winston Salem [2]	Romulus Lee Carlton M D	Winston Salem	City health officer
District [5]	Robert Rogers King M D	Boone	District health officer
Alleghany			
Ashe			
Watauga			
District [5]	James J Croley M D	Burnsville	Do
Avery			
Yancey			
District [5]	John S Chamblee M D	Windsor	Do
Bertie			
Chowan			
District [5]	Len D Hagaman M D	Lenoir	Do
Burke			
Caldwell			
District [5]	H C Whims, M D	Newton	Do
Catawba			
Lincoln			

Local health unit	Name of health officer	Post office address	Official title
North Carolina—Con			
District [5]	Murray P Whichard M D	Murphy	District health officer
Cherokee			
Clay			
Graham			
District [5]	Temporary vacancy	Currituck	Do
Currituck			
Dare			
District [5]	J Roy Hege M D M P H	Winston Salem	Do
Davie			
Forsyth			
Stokes			
Yadkin			
District [5]	Crete Nixon Sisk M D	Waynesville	Do
Haywood			
Jackson			
Macon			
Swain			
Transylvania			
District [5]	Thomas G Faison M D M P H	Winton	Do
Hertford			
Gates			
District [5]	Sigma Van Lewis, M D	Plymouth	Do
Hyde			
Tyrrell			
Washington			
District [5]	Hamilton Wright Stevens M D	Jacksonville	Do
Onslow			
Pender			
District [5]	William P Richardson M D M P H	Chapel Hill	Do
Chatham			
Orange			
Person			
District [5]	Herbert A Hudgins M D	Rutherfordton	Do
Polk			
Rutherford			
North Dakota			
Fargo [2]	E I Soderlin M D	Fargo	City health officer
District [4]	R G White M D M P H	Valley City	District health officer
Barnes			
Dickey			
LaMoure			
Ransom			
Sargent			
Stutsman			
Ohio			
Akron [2]	M D Ailes M D	Akron	Health commissioner
Allen [1]	G E Miller, M D	Lima	Do
Ashtabula [1]	Charles C Crosby M D	Jefferson	Do
Athens	Benedict B Backley M D	Athens	Do
Belmont [1]	Homer S West M D	St Clairsville	Do
Butler [3]	C J Baldridge M D	Hamilton	Do
Canton [2]	F M Sayre M D	Canton	Do
Cincinnati [2]	Carl A Wilzbach M D	Cincinnati	Do
Clermont [1]	Arthur B Ream M D	Batavia	Do
Cleveland [2]	Harold J Knapp M D	Cleveland	Do
Cleveland Heights [2]	Robert Lockhart M D	Cleveland Heights	Do
Clinton	R W DeCrow M D	Wilmington	Do
Columbus [2]	N C Dysart M D	Columbus	Do
Crawford [1]	G T Wasson M D	Bucyrus	Do
Cuyahoga [1]	A J Pearse M D	Cleveland	Do
Darke	W D Bishop M D	Greenville	Do
Dayton [2]	H H Williams M D	Dayton	Do
Erie [3]	F I Mahla M D	Sandusky	Do
Fairfield [1]	W R Coleman M D	Lancaster	Do
*Fayette [1]	James F Wilson M D	Washington Court house	Do
Greene [3]	G F Savage M D	Xenia	Do
Hamilton [1]	E H Schoenling M D	Cincinnati	Do
Huron	W W Lawrence M D	Norwalk	Do
Ironton [2]	H S Allen M D	Ironton	Do
Logan [1]	Lee Traul M D	Bellefontaine	Do
Lorain [1]	Lorin Edgar Kerr M D	Oberlin	Do
Lucas [1]	T W Mahoney M D	Toledo	Do
Madison [1]	Albert J Helm M D	London	Do
Mahoning [1]	S G Patton M D	Youngstown	Do
Marion [1]	N Sifritt M D	Marion	Do
Medina [1]	H P H Robinson M D	Medina	Do
Miami [1]	K C Beeler M D, M P H	Troy	Do [2]
Middletown [2]	J A Carter M D	Middletown	Do
Montgomery [1]	H H Pansing M D	Dayton	Do
Morrow [1]	R L Pierce M D	Mount Gilead	Do

Local health unit	Name of health officer	Post office address	Official title
Ohio—Continued.			
Muskingum [1]	Beatrice T. Hagen, M D	Zanesville	Health commissioner.
Portage [1]	P. L. Harris, M D	Ravenna	Do.
Preble [1]	Carle W. Beane, M D	Eaton	Do
Richland [3]	William B. Wild, M. D	Mansfield	Do.
Ross [3]	R E. Bower, M. D	Chillicothe	Do.
Sandusky [1]	F M. Teeple, M D	Fremont	Do.
Shelby [1]	Harry Wain, M D., M. P. H	Sidney	Do.
Springfield [2]	O. M Craven, M D	Springfield	Do.
Stark [1]	Floyd R Stamp, M D	Canton	Do.
Steubenville [2]	Julius A. Pizzoferrato	Steubenville	Do.
Summit [3]	E R Shaffer, M D	Akron	Do.
Toledo [2]	John L. Lavan, M D	Toledo	Do
Washington [1]	H E Dickson, M D	Marietta	Do.
Wayne [3]	J J Sutter, M D	Wooster	Do
Wood [1]	H J Powell, M. D	Bowling Green	Do
Wyandot [1]	L W Naus, M. D	Upper Sandusky	Do
District [5]	R L. Lawwill, M. D	West Union	Do.
Adams			
Brown			
District [5]	G Frederick Moench, M. D., M P H	Delaware	Do.
Delaware			
Union			
District [5]	H G Southard, M. D	Logan	Do
Hocking			
Vinton			
Oklahoma			
Blaine [1]	H R Anderson, M D	Watonga	Director
Bryan [3]	Paul Sizemore, M D	Durant	Do
Caddo [1]	Claude Williams, M D	Anadarko	Do.
Carter [1]	W W Mead, M D	Ardmore	Do
Cleveland [3]	William A Loy, M D, M. P H	Norman	Do
Comanche [3]	Vance F Morgan, M D, M P. H	Lawton	Do
Creek [1]	W L Pickhardt, M D	Sapulpa	Do
Kingfisher [1]	A O Meredith, M D	Kingfisher	Do
LeFlore [1]	R L Wright, M D	Poteau	Do
Logan [1]	Roy W Anderson, M D	Guthrie	Do.
McClain [1]	W M Wood, M D	Purcell	Do.
Muskogee [3]	J. T McInnis, M D	Muskogee	Do
Oklahoma [1]	George Hunter, M D	Oklahoma City	Do
Okmulgee [3]	L L Stokes, M D	Okmulgee	Do
Payne [3]	C W Moore, M D	Stillwater	Do.
Pontotoc [1]	R H Mayes, M D	Ada	Do
Pottawatomie [1]	Charles W Haygood, M D	Shawnee	Do
Seminole [3]	Mack I Shanholtz, M D., M P H	Wewoka	Do
Tulsa [2]	R M Adams, M D, M P H	Tulsa	Do
District No 1 [5]	Harry E Barnes, M D, M P H	Tahlequah	Do
Adair			
Cherokee			
Delaware			
Mayes			
Sequoyah			
District No 3 [5]	J L Nicholson, M D	Guymon	Do.
Beaver			
Cimarron			
Texas			
District No 5 [5]	Blair Points, M D	Madill	Do.
Johnston			
Love			
Marshall			
District [5]	J C Canada, M D	Atoka	Do.
Atoka			
Pushmataha			
District [5]	O. R Gregg, M. D	Hugo	Do.
Choctaw			
McCurtain			
District [5]	H R Shannon, M D	Arnett	Do.
Ellis			
Roger Mills			
District [5]	Frank M King, M. D	Woodward	Do.
Harper			
Woodward			
District [5]	F. W. Highfill, M D	Duncan	Do.
Jefferson			
Stephens			
Oregon			
Baker [1]	Elizabeth Bishop, M P H	Baker	Health officer.
Clackamas [1]	Dan P Trullinger, M D	Oregon City	Do
Clatsop [1]	E E Berg, M P H	Astoria	Do.
Coos [1]	Temporary vacancy	Coquille	Do.
Douglas [1]	E. G Wainscott, M D	Roseburg	Acting health officer.
Jackson [1]	A E Merkel, M D	Medford	Health officer.
Josephine [1]	S. B. Osgood, M. P. H	Grants Pass	Do.

Local health unit	Name of health officer	Post office address	Official title
Oregon—Continued			
Klamath [1]	Peter Rozendal, M. D.	Klamath Falls	Health officer
Lane	C. R. Lindgren, M. D.	Eugene	Acting health officer
Linn [1]	A. F. Bostrom, M. P. H.	Albany	Health officer
Marion [1]	Vernon A. Douglas, M. D.	Salem	Do.
Multnomah [1]	F. S. Hansen, M. P. H.	Portland	Do.
Portland [1,2]	Louis Wolfe, M. D.	do	Acting health officer
Union	F. I. Moon, M. D.	La Grande	Do.
Umatilla [1]	R. H. Wilcox, M. P. H.	Pendleton	Health officer
Washington [1]	F. I. Burke, M. D.	Hillsboro	Do.
Yamhill	Hollister Stolte, M. D.	McMinnville	Do.
District [5]: Sherman, Wasco	Donald Bourg, M. D.	The Dalles	Do.
Pennsylvania			
Allegheny [4]	Oliver F. Turner, M. D.	Pittsburgh	District medical officer
District [4]: Armstrong, Indiana, Jefferson	James L. Fetterman, M. D.	Indiana	Do.
District [4]: Beaver, Butler, Lawrence	Donald H. Eckles, M. D.	New Castle	Do.
District [4]: Bucks, Montgomery	Howard W. Haskell, M. D.	Norristown	Do.
District [4]: Chester, Delaware	Joseph Galia, M. D.	Chester	Do.
District [4]: Centre, Clearfield, Clinton	Thomas M. Thompson, M. D.	Philipsburg	Do.
Fayette [4]	F. H. Harmon, M. D.	Uniontown	Do.
District [4]: Greene, Washington	Arthur W. Hopper, M. D.	Washington	Do.
District [4]: Blair, Cambria, Huntingdon	George R. Good, M. D.	Altoona	Do.
Luzerne [4]	William F. Davison, M. D.	Wilkes Barre	Do.
Rhode Island			
Central Falls [2]	Omer H. Masse, M. D.	Central Falls	Health officer
Cranston [2]	Charles L. Southey, M. D.	Cranston	Do.
Pawtucket [2]	Albert L. Vandale, M. D.	Pawtucket	Superintendent of health
Providence [2]	Michael J. Nestor, M. D.	Providence	Do.
Warwick [2]	Raymond Luft, M. D.	Warwick	Health officer
Woonsocket [2]	James P. O'Brien, M. D.	Woonsocket	Do.
Northern District [4]: Providence (excluding [6] municipalities)	James P. O'Brien, M. D.	do	District health officer
Southern District [4]: Kent (excluding city of Warwick), Washington	Raymond F. McAteer, M. D.	West Warwick	Do.
Southeastern District [4]: Bristol, Newport	Joseph Castronovo, M. D.	Bristol	Do.
South Carolina			
Aiken	J. T. Hair, M. D.	Aiken	Health officer
Anderson [1]	Goodman Bare, M. D.	Anderson	Do.
Berkeley	W. K. Fishburne, M. D.	Moncks Corner	Do.
Charleston [3]	Leon Banov, M. D.	Charleston	Do.
Cherokee	G. R. Westrope, M. D.	Gaffney	Do.
Colleton	L. W. Luttrell, M. D.	Walterboro	Do.
Darlington [1]	W. A. Corrigan, M. D.	Darlington	Do.
Dorchester [1]	H. D. Herring, M. D.	St. George	Do.
Fairfield	J. T. Bryson, M. D.	Winnsboro	Do.
Florence	J. R. Claussen, M. D.	Florence	Do.
Georgetown [1]	John Ryan, M. D.	Georgetown	Do.
Greenville	J. N. Holtzclaw, M. D.	Greenville	Do.
Greenwood [1,3]	J. I. Brodie, M. D.	Greenwood	Do.
Horry	J. H. Edwards, M. D.	Conway	Do.
Kershaw [1]	A. W. Humphries, M. D.	Camden	Do.
Lancaster	W. G. Crawley, M. D.	Lancaster	Do.
Lee [1]	I. A. Simmons, M. D.	Bishopville	Do.
Lexington	G. H. Zerbst, M. D.	Lexington	Do.
Newberry [1]	J. C. Sease, M. D.	Newberry	Do.

Local health unit	Name of health officer	Post office address	Official title
South Carolina—Con			
Orangeburg [1]	G C Bolin M D	Orangeburg	Health officer
Richland [1]	F P White M D D P H	Columbia	Do
Spartanburg [1]	O D Garvin, M D M P H	Spartanburg	Do
Sumter	F A Heise M D M P H	Sumter	Do
Williamsburg [1]	B M Montgomery M D	Kingstree	Do
District [5]	M J Boggs, Jr M D M P H	Abbeville	Do
Abbeville			
McCormick			
District [5]	C F Ballard M D	Allendale	Do
Allendale			
Hampton			
District [5]	L T Claytor M D	Barnwell	Do
Bamberg			
Barnwell			
District [5]	W B Jones M D	Beaufort	Do
Beaufort			
Jasper			
District [5]	B F Ford M D	St Mathews	Do
Calhoun			
Clarendon			
District [5]	R D Hicks M D	Chester	Do
Chester			
York			
District [5]	C P Pope M D	Chesterfield	Do
Chesterfield			
Marlboro			
District [5]	T C Hankins M D	Dillon	Do
Dillon			
Marion			
District [5]	F K Fairey M D	Edgefield	Do
Edgefield			
Saluda			
District [5]	J C Brabham M D	Laurens	Do
Laurens			
Union			
District [5]	W F Baldwin M D	Walhalla	Do
Oconee			
Pickens			
South Dakota			
Harding	Temporary vacancy	Buffalo	Director
Hutchinson	R H Payne M D	Freeman	Do
Pennington [1]	Fred P Bestgen M D M P H	Rapid City	Do
Union	Temporary vacancy	Elk Point	Do
District [4]	F R Linard M D	Philip	Do
Bennett			
Haakon			
Jackson			
Jones			
Mellette			
Washabaugh			
Tennessee			
Blount	W N Dawson M D M P H	Maryville	Do
Bradley [1]	J W Dabbs M D	Cleveland	Do
Carroll	W H Walcott M D	Huntingdon	Do
Cocke	I W Frame M D M P H	Newport	Do
Davidson [1]	J J Lentz M D	Nashville	Do
Fayette	J T Nardo M D	Somerville	Do
Franklin [1]	J P Moon M D	Winchester	Do
Gibson [1]	E P Bowerman M D M P H	Trenton	Do
Giles	D M Cowgill M D C P H	Pulaski	Do
Greene [1]	R L Cobb M D	Greeneville	Do
Grundy [1]	U B Bowden M D	Pelham	Do
Hamilton [3]	F O Pearson M D M P H	Chattanooga	Do
Hardeman [1]	R L Cobb M D	Bolivar	Do
Hardin [1]	C Whitman Borg, M D	Savannah	Do
Hawkins [1]	L S Tucker M D	Rogersville	Do
Hickman [1]	W I Phillips M D	Centerville	Do
Knox [1]	A G Hufstedler M D	Knoxville	Do
Knoxville [2]	W H Francis M D M P H	do	Do
Lauderdale [1]	H D Cochran M D	Ripley	Do
Lincoln [1]	M C Woodfin M D M P H	Fayetteville	Do
Madison [1]	L D Farragut, M D M P H	Jackson	Do
Marshall [1]	H A Morgan M D M P H	Lewisburg	Do
Maury [3]	H C Busby M D M P H	Columbia	Do
McMinn [1]	A W Reeser M D	Athens	Do
Memphis [2]	L M Graves M D	Memphis	Do
Monroe [1]	R J Settle M D	Madisonville	Do
Montgomery [3]	F J Malone M D	Clarksville	Do
Nashville [2]	John Overton M D	Nashville	Do
Roane [1]	J C Fly M D	Kingston	Do
Rutherford [1]	J B Black M D D P H	Murfreesboro	Do
Sevier [1]	R Mel Perry M D	Sevierville	Do
Shelby	W D Burkhalter M D, M P H	Memphis	Do

Local health unit	Name of health officer	Post office address	Official title
Tennessee—Con			
Sullivan [1]	J W Erwin M D M P H	Blountville	Director
Sumner [1]	W M Dedman M D M P H	Gallatin	Do
Tipton [1]	M M Satterfield M D	Covington	Do
Warren [1]	F N Hesbacher M D	McMinnville	Do
Washington [3]	R O Ingham M D M P H	Jonesboro	Do
Weakley [1]	M D Ingram M D	Dresden	Do
Williamson [1]	W B Farris M D	Franklin	Do
Wilson	R C Kash M D M P H	Lebanon	Do
District [5]	A J Butler M D M P H	Clinton	Do
Anderson			
Campbell			
District [5]	H M Roberson M D	Pikeville	Do
Bledsoe			
Sequatchie			
District [5]	C A Hicks, M D	Elizabethton	Do
Carter			
Johnson			
Unicoi			
District [5]	D C Parmenter M D	Dyersburg	Do
Crockett			
Dyer			
District [5]	Maxwell E Raine M D	Morristown	Do
Hamblen			
Jefferson			
District [5]	W C Ramer M D	Lexington	Do
Decatur			
Henderson			
District [5]	M R Beyer M D S P H	Waverly	Do
Houston			
Humphreys			
District [5]	Myrtle I Smith M D	Lafayette	Do
Macon			
Trousdale			
District [5]	E W Barkdull M D	Union City	Do
Lake			
Obion			
District [5]	H C Miles M D	Dayton	Do
Meigs			
Rhea			
Upper Cumberland No 1 [5]	J I Mason M D	Livingston	Do
Clay			
Jackson			
Overton			
Pickett			
Upper Cumberland No 2 [5]	Price H Duff M D	Crossville	Do
Cumberland			
Fentress			
Morgan			
Texas			
Bexar [1]	R G Lander M D	San Antonio	Acting director
Bowie [3]	W V Besonette M D	Texarkana	Director
Brazos [3]	J F Doll M D M P H	Bryan	Do
Brown [3]	C W Kelley M D	Brownwood	Do
Cameron [3]	Grady Deaton M D	San Benito	Do
Cass [1]	Fred K Laurentz M D	Linden	Do
Collin [1]	John M Hooper M D M P H	McKinney	Do
Cooke [1]	H H Terry M D	Gainesville	Do
Dallas [2]	J M Dewis M D	Dallas	Acting director
Dallas [1]	Horace F Duncan M D M P H	do	Director
Fort Worth [2]	H M Williams M D	Fort Worth	Acting director
Hidalgo [3]	Joe W May M D	Edinburg	Director
Houston [2]	Austin E Hill M D M P H	Houston	Do
Hunt [1]	H C Shilling M D	Greenville	Do
Jefferson [3]	I I Walter M D M P H	Port Neches	Do
Noal [3]	J I Peavy M D	Sweetwater	Do
Nueces [3]	F W Prothro M D M P H	Corpus Christi	Do
Orange [1]	Gregory L Endres M D	Orange	Do
San Antonio [2]	W A King M D	San Antonio	Do
San Augustine [1]	John Schreiber M D	San Augustine	Do
Smith [3]	Henry C Wilson M D	Tyler	Do
Tarrant [1]	W B Nies M D	Fort Worth	Do
Taylor [3]	George A Gray M D	Abilene	Do
Travis	Harold Wood M D M P H	Austin	Do
Upshur [1]	S W Wilson M D	Gilmer	Do
Wichita [1]	Lewis C Robbins M D	Wichita Falls	Do
District [5]	L T Cox M D	El Paso	Do
El Paso			
Hudspeth			

Local health unit	Name of health officer	Post office address	Official title
Texas—Continued			
District [5]	George G Howard M D	El Campo	Director
Calhoun			
Jackson			
Matagorda			
Victoria			
Wharton			
District [5]	A L Waller M D	Woodville	Do
Hardin			
Tyler			
District [5]	B H Estess M D	Jasper	Do
Jasper			
Newton			
District [5]	H H Puckett M D	Alice	Do
Duval			
Jim Wells			
District [5]	E S Freeman M D	Liberty	Do
Chambers			
Liberty			
District [5]	S W Kellam M D	Midland	Do
Ector			
Midland			
District [5]	Roy G Reed M D	Cameron	Do
Milan			
Robertson			
District [5]	H E Wright M D	Mineral Wells	Do
Palo Pinto			
Parker			
District [5]	Evan C Bourdon M D	Uvalde	Do
Kinney			
Uvalde			
Zavala			
District [5]	William S Brumage M D	Brownfield	Do
Dawson			
Hockley			
Gaines			
Terry			
Yoakum			
Utah			
Davis	D Keith Barnes M D C P H	Farmington	County health officer
District No 1 [4]	Murland W Fish M D	Ogden	District health officer
Box Elder			
Cache			
Daggett			
Morgan			
Rich			
Summit			
Weber			
District No 2 [4]	A A Jenkins M D C P H	Cedar City	Do
Beaver			
Garfield			
Iron			
Kane			
Piute			
Washington			
District No 3 [4]	Edward I Van Aelstyn M D C P H	Price	Do
Carbon			
Emery			
Grand			
San Juan			
District No 4 [4]	Temporary vacancy	Provo	Do
Duchesne			
Salt Lake			
Tooele			
Uintah			
Utah			
Wasatch			
District No 5 [4]	A A Jenkins M D C P H	Richfield	Do
Juab			
Millard			
Sanpete			
Sevier			
Wayne			
Virginia			
Albemarle [3]	Thomas S Englar M D C P H	Charlottesville	Health officer
Arlington [1]	R G Beachley M D D P.H	Arlington [5]	Director of health and welfare
Augusta [1]	V A Turner M D C P H	Staunton	Health officer
Buchanan [1]	Paul J Bundy M D	Grundy	Do
Charlotte [1]	Paul W Bowden M D M P H	Charlotte C H	Do
Chesterfield [1]	Earle C Gates M D C P H	Chesterfield	Do
Fairfax [1]	G R Carpenter M D C P H	Fairfax	Do
Halifax [1]	D C Steelsmith M D C P H	South Boston	Do

Local health unit	Name of health officer	Post office address	Official title
Virginia—Continued			
Hanover [1]	J. D. Hamner, Jr., M. D., C. P. H.	Ashland	Health officer.
Henrico [1]	J. H. Crouch, M. D., C. P. H.	R. F. D. No. 1, Richmond.	Do.
Loudoun [1]	C. E. Waller, M. D.	Leesburg	Do.
Montgomery [1]	A. Glenn Evans, M. D., M. P. H.	Christiansburg	Do.
Northampton [1]	William Y. Garrett, M. D., M. P. H.	Eastville	Do.
Orange [1]	R. Bruce Mallett, M. D.	Orange	Do.
Pittsylvania [1]	Marvin E. McRae, M. D.	Chatham	Do.
Pulaski [1]	T. F. McGough, M. D.	Pulaski	Do.
Rockbridge [1]	R. P. Cooke, M. D.	Lexington	Do.
Rockingham [1]	Thomas Scarlett, M. D.	Harrisonburg	Do.
Smyth [1]	S. D. Sturkie, M. D., C. P. H.	Marion	Do.
Southampton [1]	Hubert D. Crow, M. D.	Courtland	Do.
Washington [1]	John G. McNiel, M. D., M. P. H.	Abingdon	Do.
Wise [1]	P. R. Cronlund, M. D.	Norton	Do.
Wythe [1]	Beverly L. Holladay, M. D.	Wytheville	Do.
District [5]	Wyatt E. Roye, M. D.	Covington	Do.
Alleghany			
Botetourt			
District [5]	T. H. Valentine, M. D.	Lawrenceville	Do.
Brunswick			
Greensville			
Mecklenburg			
District [5]	B. Randolph Allen, M. D., M. P. H.	Suffolk	Do.
Isle of Wight			
Nansemond			
District [5]	J. Leake, M. D.	Portsmouth	Do.
Norfolk			
Princess Anne			
District [5]	S. S. Shouse, M. D.	Luray	Do
Page			
Shenandoah			
Warren			
Peninsula District [5]	W. W. Fuller, M. D., C. P. H.	Williamsburg	Do
Elizabeth City			
James City			
Warwick			
York			
District [5]	J. McIver Jackson, M. D.	Manassas	Do
Prince William			
Stafford			
District [5]	Linwood Farley, M. D.	Richlands	Do.
Russell			
Tazewell			
Southside District [5]	J. N. Dudley, M. D., C. P. H.	Farmville	Do.
Buckingham			
Nottoway			
Prince Edward			
District [5]	Francis J. Clements, M. D.	Stony Creek	Do.
Prince George			
Sussex			
Washington:			
Chelan [3]	Paul L. West, M. D.	Wenatchee	Do.
Clallam [3]	A. E. Eyres, M. D.	Port Angeles	Do
Clark [3]	C. B. Fargher, M. D.	Vancouver	Do.
Cowlitz [1]	T. H. Biggs, M. D.	Kelso	Do.
Kitsap [3]	H. M. Graning, M. D.	Bremerton	Do.
Lewis [1]	Eugene Kidd, M. D.	Centralia	Do
Pierce [1]	N. E. Magnussen, M. D.	Tacoma	Do.
Seattle [2]	Frank Carroll, M. D.	Seattle	Do
Snohomish [1]	Temporary vacancy	Everett	Do
Spokane [2]	Ralph Hendricks, M. D.	Spokane	Do
Spokane [1]	A. E. Lien, M. D.	do	Do.
Tacoma [2]	L. E. Powers, M. D.	Tacoma	Do.
Walla Walla [3]	J. A. Kahl, M. D.	Walla Walla	Do.
Whitman [3]	E. E. Palmquist, M. D.	Colfax	Do
Yakima [3]	Stanley R. Benner, M. D.	Yakima	Do.
District [5]	S. P. Lehman, M. D.	Olympia	Do.
Mason			
Thurston			
West Virginia:			
Berkeley [1]	H. R. DuPuy, M. D.	Martinsburg	County health officer.
Bluefield [2]	David B. Lepper, M. D.	Bluefield	City health officer.
Boone [1]	R. L. Hunter, M. D.	Madison	County health officer.
Brooke [1]	W. T. Booher, M. D.	Wellsburg	Acting county health officer.
Charleston [2]	Frederick Carlson, M. D.	Charleston	City health officer.
Clarksburg [2]	R. L. Osborn, M. D.	Clarksburg	Do.
Fayette [1]	N. G. Angstadt, M. D.	Fayetteville	County health officer.
Hancock [1]	T. H. Bruce, M. D.	New Cumberland	Do.
Harrison [1]	A. J. Kemper, M. D.	Clarksburg	Do.
Kanawha [1]	Owen A. Grove, M. D.	Charleston	Do.

Local health unit	Name of health officer	Post office address	Official title
West Virginia—Con.			
Logan [1]	W. P. Hamilton, M. D	Logan	County health officer.
Marion [1]	J. W. Davis, M. D	Fairmont	Do.
Marshall [1]	W. G. C. Hill, M. D	Moundsville	Do.
Monongalia [1]	L. A. MacLean, M. D	Morgantown	Do.
Ohio [1]	Harry A. Smith, M. D	Wheeling	Do.
Preston [1]	C. Y. Moser, M. D	Kingwood	Do.
Raleigh [1]	J. M. Coram, M. D	Beckley	Do.
Wetzel [1]	M. A. Viggiano, M. D	New Martinsville	Do
Wheeling [2]	Harry A. Smith, M. D	Wheeling	City health officer.
Wood [1]	Earl H. Kirk, M. D	Parkersburg	County health officer.
District No. 1 [4]	H. W. Ward, M. D	Sutton	District health officer.
Braxton			
Clay			
Nicholas			
Webster			
District No 2 [4]	Herbert Duncan, M. D	Lewisburg	Do.
Greenbrier			
Monroe			
Pocahontas			
District No 3 [4]	Claude A. Thomas, M. D	Point Pleasant	Do.
Jackson			
Mason			
Putnam			
Roane			
District No. 4 [4]	Paul Wilhelm, M. D	Weston	Do.
Calhoun			
Gilmer			
Lewis			
Upshur			
District No. 5 [4]	J D Brown, M. D	Romney	Do.
Grant			
Hampshire			
Hardy			
Mineral			
Morgan			
Wisconsin			
Appleton [2]	F. J. Huberty, M. D	Appleton	City health officer
Eau Claire [3]	Charles K Kincaid, M D., M. S P H	Eau Claire	County health officer.
Fond du Lac [2]	R L Dana, M. D	Fond du Lac	City health officer.
Green Bay [2]	Leo M Shinners, M. D	Green Bay	Do.
Janesville [2]	Fred B Welch, M D	Janesville	Do
Kenosha [2]	A J Randall, M D	Kenosha	Do
La Crosse [2]	A M Murphy	La Crosse	Do.
Madison [2]	F F Bowman, M D	Madison	Do.
Marathon [1]	Temporary vacancy	Wausau	County health officer.
Milwaukee [2]	E R Krumbiegel, M D	Milwaukee	Commissioner of public health
Oshkosh [2]	W P Wheeler, M D	Oshkosh	City health officer.
Racine [2]	I. F Thompson, M D	Racine	Do
Rock [1]	Margaret Hatfield, M D	Janesville	County health officer.
Sheboygan [2]	G J Hildebrand, M. D	Sheboygan	City health officer
Superior [2]	C. H Mason, M. D	Superior	Do.
West Allis [2]	Frank H Russell, M D	West Allis	Do
Wausau [2]	L F Bugbee	Wausau	Do
District No 1 [4]	Arthur R Zintek, M. D	Madison	District health officer.
Columbia			
Crawford			
Dane			
Grant			
Green			
Iowa			
Lafayette			
Richland			
Sauk			
District No. 2 [4]	R. N. Nelson, M. D	Elkhorn	Do.
Jefferson			
Kenosha			
Milwaukee			
Racine			
Walworth			
Waukesha			
District No. 3 [4]	V. A. Gudex, M D	Fond du Lac	Do.
Calumet			
Dodge			
Fond du Lac			
Manitowoc			
Ozaukee			
Sheboygan			
Washington			
Winnebago			

Local health unit	Name of health officer	Post office address	Official title
Wisconsin—Con.			
District No 4 [4]	O. F Gootsch, M D	Sparta	District health officer.
Adams			
Green Lake			
Juneau			
LaCrosse			
Marquette			
Monroe			
Vernon			
Waushara			
District No 5 [4]	Temporary vacancy	Neillsville	Do.
Buffalo			
Clark			
Jackson			
Pepin			
Portage			
Trempealeau			
Wood			
District No 6 [4]	Arthur Van Duser, M D	Green Bay	Do.
Brown			
Door			
Kewaunee			
Marinette			
Oconto			
Outagamie			
Shawano			
Waupaca			
District No 7 [4]	F P Daly, M D	Chippewa Falls	Do
Barron			
Chippewa			
Dunn			
Pierce			
Polk			
Rusk			
St Croix			
District No 8 [4]	Frances Cline, M D	Rhinelander	Do.
Florence			
Forest			
Langlade			
Lincoln			
Oneida			
Price			
Taylor			
Vilas			
District No 9 [4]	M W. Meyer, M D	Ashland	Do.
Ashland			
Bayfield			
Burnett			
Douglas			
Iron			
Sawyer			
Washburn			
Wyoming			
Laramie [3]	Walter S Kotas, M D, B S	Laramie	County health officer

DEATHS DURING WEEK ENDED FEBRUARY 21, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Feb. 21, 1942	Corresponding week, 1941
Data from 88 large cities of the United States:		
Total deaths	9,469	9,043
Average for 3 prior years	9,514	
Total deaths, 7 weeks	65,065	69,110
Deaths per 1,000 population, 7 weeks, annual rate	13 0	13 8
Deaths under 1 year of age	582	524
Average for 3 prior years	539	
Deaths under 1 year of age, 7 weeks	3,968	3,768
Data from industrial insurance companies:		
Policies in force	64,912,414	64,708,572
Number of death claims	14,116	15,265
Death claims per 1,000 policies in force, annual rate	11 3	12 3
Death claims per 1,000 policies, 7 weeks, annual rate	10 2	11 2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED FEBRUARY 28, 1942

Summary

The current incidence of measles, meningococcus meningitis, and poliomyelitis is above the 5-year (1937–41) median expectancy, and the cumulative figures for these diseases and for whooping cough are above the 5-year cumulative median.

While only 5 States reported more than 5 cases of meningococcus meningitis (New York 11, Texas 7, Connecticut, Maryland, and Virginia 6 each), the total for the week increased slightly, from 84 to 87, as compared with the preceding week. The current incidence is above the 5-year median, 51 cases, and higher than the incidence for the corresponding week of the three preceding years. A total of 503 cases has been reported to date this year (first 8 weeks), as compared with a 5-year cumulative median of 437 cases for the corresponding period. In both 1937 and 1938 the incidence was higher than it has been to date this year.

The number of cases of influenza increased from 5,308 to 5,984, but the current incidence is lower than that for any corresponding week of the preceding 5 years with the exception of 1938.

A total of 29 cases of poliomyelitis was reported as compared with 26 last week and 18 for the 5-year median. The current incidence is higher than that for the corresponding week of each of the past 5 years. The incidence of measles is slightly above the median expectancy, but only about half as high as last year.

Other reports for the week include 102 cases of bacillary dysentery (58 in Texas, 16 in Georgia), 14 cases of amebic dysentery, 39 cases of unspecified dysentery (26 in Virginia, 12 in Arizona), and 2 cases of anthrax (1 in Pennsylvania, 1 in Utah). Only 16 cases of smallpox were reported, as compared with 37 last year. The current figure is the lowest on record for the corresponding week.

The crude death rate for the current week for 88 large cities in the United States is 12.7 per 1,000 population, as compared with 13.2 for the preceding week and 13.3 for the 3-year (1939–41) average.

Telegraphic morbidity reports from State health officers for the week ended February 28, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Feb. 28, 1942	Mar. 1, 1941		Feb. 28, 1942	Mar. 1, 1941		Feb. 28, 1942	Mar. 1, 1941		Feb. 28, 1942	Mar. 1, 1941	
NEW ENG.												
Maine	0	0	1	9	28	25	177	88	44	1	0	0
New Hampshire	1	0	0	------	10	------	8	37	23	2	0	0
Vermont	0	0	0	------	------	------	4	47	11	0	0	0
Massachusetts	2	1	3	------	------	------	411	682	682	5	1	2
Rhode Island	1	0	0	1	2	------	176	4	15	0	1	1
Connecticut	1	1	3	3	62	29	238	52	150	6	1	0
MID. ATL.												
New York	27	18	26	[1] 13	[1] 68	[1] 68	723	5,545	1,273	11	1	5
New Jersey	3	11	10	15	183	44	208	2,023	1,190	2	1	1
Pennsylvania	12	16	41	------	------	------	1,027	4,434	254	3	7	7
E. NO. CEN.												
Ohio	10	5	17	24	104	104	177	3,149	99	3	1	3
Indiana	6	11	12	21	97	52	87	478	23	1	1	1
Illinois	19	34	29	12	49	52	376	2,861	36	3	0	2
Michigan [2]	4	4	15	------	112	20	150	3,496	447	0	0	1
Wisconsin	0	0	3	63	240	220	510	668	668	0	0	1
W. NO. CEN.												
Minnesota	6	1	4	3	19	3	758	4	35	0	1	0
Iowa	4	3	3	8	194	65	289	160	159	0	0	0
Missouri	3	12	19	4	18	32	400	141	54	1	0	2
North Dakota	0	3	1	6	85	44	42	8	8	0	0	0
South Dakota	1	1	1	------	2	2	7	21	------	1	0	0
Nebraska	3	0	4	------	------	------	108	4	33	0	0	0
Kansas	3	5	5	17	91	41	343	429	322	2	0	0
SOUTH ATLANTIC												
Delaware	4	1	1	------	------	------	2	312	21	0	0	0
Maryland [2]	1	3	4	21	113	113	385	115	115	6	3	2
District of Columbia	0	2	7	2	15	15	44	67	19	2	1	1
Virginia	15	10	14	987	1,600	1,600	177	1,864	269	6	0	0
West Virginia	4	4	8	42	113	113	307	306	49	5	0	3
North Carolina	10	14	22	36	154	154	1,606	490	490	0	4	2
South Carolina	3	2	4	950	1,056	945	260	268	54	1	5	2
Georgia	2	2	8	147	547	547	419	200	200	0	0	1
Florida	8	9	9	13	229	9	222	395	138	0	1	0
E. SO. CEN.												
Kentucky	5	3	9	104	107	107	55	723	243	1	6	6
Tennessee	3	3	7	------	548	231	226	185	78	5	1	2
Alabama	6	2	13	620	490	490	172	805	258	3	1	3
Mississippi [2]	9	3	6	------	------	------	------	------	------	1	0	1
W. SO. CEN.												
Arkansas	11	3	9	395	711	711	314	146	68	1	0	0
Louisiana	1	5	12	11	133	133	83	59	12	1	1	2
Oklahoma	6	6	6	93	209	218	393	11	72	1	0	1
Texas	[3] 36	44	35	1,667	1,658	1,658	1,843	620	322	7	2	2
MOUNTAIN												
Montana	3	0	2	11	29	132	125	9	22	1	0	0
Idaho	1	1	1	------	11	11	34	19	34	0	0	0
Wyoming	0	0	0	302	29	------	119	80	57	1	1	0
Colorado	1	13	8	64	64	25	[3] 228	167	95	1	1	1
New Mexico	0	2	1	1	24	3	112	199	62	0	0	0
Arizona	3	4	4	156	181	181	182	111	25	0	0	0
Utah [2]	0	1	0	13	20	17	111	26	155	0	0	0
Nevada	0	0	------	------	------	------	61	0	------	0	0	------
PACIFIC												
Washington	2	4	4	3	14	4	111	121	121	0	0	1
Oregon	2	0	2	21	30	3	132	391	28	0	0	0
California	6	12	21	126	668	580	2,931	130	252	3	2	2
Total	243	279	441	5,984	10,117	10,117	16,873	31,650	15,134	87	44	51
Eight weeks	[3] 2,639	2,374	4,483	39,064	432,807	114,544	97,483	137,650	90,202	503	382	437

See footnotes at end of table.

***Telegraphic morbidity reports from State health officers for the week ended February 28, 1942, and comparison with corresponding week of 1941 and 5-year median*—Con.**

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Feb. 28, 1942	Mar. 1, 1941		Feb. 28, 1942	Mar. 1, 1941		Feb. 28, 1942	Mar. 1, 1941		Feb. 28, 1942	Mar. 1, 1941	
NEW ENG.												
Maine	0	0	0	13	7	15	0	0	0	0	0	0
New Hampshire	1	0	0	34	2	3	0	0	0	2	0	0
Vermont	0	0	0	27	4	5	0	0	0	2	1	0
Massachusetts	1	0	0	318	166	233	0	0	0	2	1	1
Rhode Island	2	0	0	24	8	15	0	0	0	0	0	0
Connecticut	0	0	0	37	35	88	0	0	0	1	2	1
MID. ATL.												
New York	1	1	1	423	467	740	0	0	0	5	10	5
New Jersey	2	1	0	161	365	187	0	0	0	0	1	1
Pennsylvania	1	0	0	535	331	408	0	0	0	3	3	4
E. NO. CEN.												
Ohio	4	2	1	318	251	482	0	0	7	2	3	3
Indiana	0	0	0	186	170	216	0	0	8	4	0	0
Illinois	1	1	1	327	475	582	0	6	11	1	2	3
Michigan	0	0	0	241	280	585	0	0	4	0	3	3
Wisconsin	1	0	0	170	127	214	1	8	7	0	0	0
W. NO. CEN.												
Minnesota	0	0	0	117	42	118	0	9	9	1	1	0
Iowa	0	0	0	71	58	159	3	1	34	0	0	0
Missouri	0	0	0	146	97	101	2	4	4	1	0	4
North Dakota	0	0	0	30	9	18	0	0	6	0	0	0
South Dakota	0	0	0	34	16	15	1	3	3	0	0	0
Nebraska	0	0	0	98	16	47	0	0	0	0	0	0
Kansas	0	0	0	117	73	132	0	0	9	0	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	39	15	7	0	0	0	0	0	0
Maryland	0	1	0	62	61	53	0	0	0	1	0	0
Dist. of Col.	0	1	0	12	11	20	0	0	0	0	0	1
Virginia	0	0	0	40	35	35	0	0	0	1	2	2
West Virginia	0	0	0	43	57	53	0	0	0	2	1	3
North Carolina	2	1	1	44	55	52	0	0	0	1	0	4
South Carolina	1	0	0	8	13	5	0	0	0	1	3	3
Georgia	0	1	0	20	15	14	0	0	0	14	0	1
Florida	1	2	1	5	1	9	0	0	0	6	5	1
E. SO. CEN.												
Kentucky	0	0	0	73	144	88	1	0	0	1	2	2
Tennessee	1	0	0	80	122	62	1	0	3	3	5	4
Alabama	0	1	2	37	18	12	2	2	0	1	3	2
Mississippi	1	2	1	10	5	8	0	0	0	1	2	2
W. SO. CEN.												
Arkansas	2	1	1	6	17	11	2	0	5	1	4	0
Louisiana	1	1	0	7	11	13	0	0	0	3	4	6
Oklahoma	0	0	0	32	32	32	[3] 0	1	6	2	0	0
Texas	3	1	1	[3] 55	62	77	[3] 1	2	5	2	4	6
MOUNTAIN												
Montana	1	0	0	15	22	33	0	0	3	0	0	0
Idaho	0	0	0	3	6	19	0	0	1	0	1	0
Wyoming	0	0	0	44	3	6	1	0	0	0	1	0
Colorado	0	0	0	42	28	45	0	0	11	0	2	0
New Mexico	0	0	0	3	3	17	0	0	0	0	1	0
Arizona	0	0	0	6	5	14	1	0	1	0	1	1
Utah	0	0	0	43	12	24	0	0	0	0	0	0
Nevada	0	0	------	0	0	------	0	0	------	0	0	------
PACIFIC												
Washington	0	0	0	40	27	57	0	1	5	0	4	2
Oregon	0	0	0	18	13	32	0	0	4	0	1	0
California	2	1	1	125	118	184	0	0	9	1	2	2
Total	29	18	18	4,339	3,910	5,430	16	37	283	65	75	82
8 weeks	209	222	174	[3] 30,265	27,732	42,750	[3] 195	375	2,364	645	554	885

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended February 28, 1942—Continued

Division and State	Whooping cough Week ended— Feb. 28, 1942	Whooping cough Week ended— Mar 1, 1941	Week ended Feb. 28, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	37	28	0	0	0	0	0	0	0	0	0
New Hampshire	0	24	0	0	0	0	0	0	0	0	0
Vermont	68	28	0	0	0	0	0	0	0	0	0
Massachusetts	125	262	0	0	0	0	0	0	0	0	0
Rhode Island	47	12	0	0	0	0	0	0	0	0	0
Connecticut	60	45	0	0	9	0	0	0	0	0	0
MID. ATL.											
New York	422	341	0	4	11	0	5	0	0	0	0
New Jersey	215	107	0	0	0	0	1	0	0	0	0
Pennsylvania	0	421	1	0	0	0	0	0	0	1	0
E NO. CEN.											
Ohio	177	373	0	0	0	0	0	0	1	1	0
Indiana	59	27	0	0	0	0	0	0	0	0	0
Illinois	163	85	0	0	0	0	2	0	0	1	0
Michigan	137	375	0	0	0	0	0	0	0	0	0
Wisconsin	199	104	0	0	0	0	0	0	0	0	0
W NO CEN											
Minnesota	40	65	0	0	0	0	0	0	0	0	0
Iowa	12	28	0	0	0	0	0	0	0	0	0
Missouri	32	55	0	0	0	0	0	0	0	5	0
North Dakota	13	14	0	0	0	0	0	0	0	0	0
South Dakota	7	7	0	0	0	0	0	0	0	0	0
Nebraska	12	25	0	0	0	0	0	0	0	0	0
Kansas	39	132	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC											
Delaware	0	21	0	0	0	0	0	0	0	0	0
Maryland	46	84	0	0	0	1	0	0	0	0	0
Dist of Col	25	11	0	0	0	0	0	0	0	0	0
Virginia	47	159	0	0	0	26	0	0	0	0	0
West Virginia	70	53	0	0	0	0	0	0	0	0	0
North Carolina	126	280	0	0	0	0	0	0	0	0	4
South Carolina	58	83	0	0	0	0	0	0	0	0	3
Georgia	8	56	0	1	16	0	0	0	0	1	7
Florida	14	21	0	0	0	0	0	0	0	0	6
E SO. CEN.											
Kentucky	53	67	0	0	0	0	0	0	0	0	0
Tennessee	55	71	0	0	0	0	1	0	0	0	1
Alabama	25	28	0	0	0	0	0	0	0	0	6
Mississippi	------	------	0	0	0	0	0	0	0	1	0
W SO. CEN.											
Arkansas	6	53	0	2	5	0	0	0	0	1	0
Louisiana	2	18	0	0	0	0	0	0	0	6	1
Oklahoma	13	27	0	0	0	0	0	0	0	0	0
Texas	78	342	0	3	58	0	0	0	0	0	8
MOUNTAIN											
Montana	12	32	0	0	0	0	0	0	0	0	0
Idaho	5	14	0	0	0	0	0	0	0	0	0
Wyoming	4	1	0	0	0	0	0	0	0	0	0
Colorado	40	58	0	0	1	0	0	0	0	0	0
New Mexico	31	17	0	0	0	0	0	0	0	0	0
Arizona	46	2	0	0	0	12	0	0	0	0	0
Utah	19	76	1	0	0	0	0	0	0	0	0
Nevada	4	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	104	107	0	0	0	0	0	0	0	0	0
Oregon	31	10	0	0	0	0	0	0	0	0	0
California	247	341	0	4	2	0	0	0	0	0	0
Total	3,033	4,590	2	14	102	39	9	0	1	17	36
8 weeks	32,295	34,573	-			----	-------	-------	------		------

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Corrected figures have been received as follows Week ended Feb. 14· Scarlet fever, Texas, 43 cases; smallpox, Oklahoma, 26 cases, Texas, 21 cases. Week ended Feb 21· Diphtheria, Texas, 42 cases; measles, Colorado, 206 cases.

WEEKLY REPORTS FROM CITIES

City reports for week ended February 14, 1942

This table lists the reports from 60 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	8	3	4	1	2	0	9	0	0	1
Billings, Mont	0	0	------	0	0	0	0	0	0	0	0	0
Boise, Idaho	0	0	------	0	1	0	0	0	0	0	0	2
Boston, Mass	0	0	------	1	61	0	18	0	98	0	1	81
Bridgeport, Conn	0	0	------	0	5	0	2	1	3	0	0	3
Brunswick, Ga	0	0	------	0	38	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	------	1	7	0	6	0	17	0	1	7
Chicago, Ill	9	0	11	3	64	0	44	0	114	0	1	64
Cincinnati, Ohio	0	0	1	2	0	0	2	0	25	0	0	13
Cleveland, Ohio	0	0	11	2	5	2	13	0	52	0	0	21
Columbus, Ohio	0	0	------	0	6	0	4	0	5	0	0	15
Concord, N. H	0	0	------	0	0	0	1	0	0	0	0	0
Dallas, Tex	5	0	2	1	101	0	5	0	5	0	1	6
Denver, Colo	8	0	15	2	66	0	6	0	1	0	0	2
Detroit, Mich	3	0	------	0	84	0	23	0	160	0	0	57
Fargo, N. Dak	0	0	------	0	0	0	2	0	0	0	0	1
Flint, Mich	0	0	------	1	0	0	2	0	10	0	0	4
Grand Rapids, Mich	0	0	------	0	10	0	3	0	2	0	0	9
Great Falls, Mont	0	0	------	0	55	0	0	0	0	0	0	4
Hartford, Conn	0	0	------	0	10	0	1	0	6	0	0	7
Helena, Mont	0	0	------	0	2	0	0	0	0	0	0	0
Indianapolis, Ind	0	0	------	1	14	0	4	0	28	0	0	35
Kansas City, Mo	0	0	------	1	3	0	2	0	25	0	0	3
Little Rock, Ark	0	0	20	0	54	0	2	0	0	0	0	2
Lynchburg, Va	0	0	------	0	0	0	2	0	0	0	0	8
Memphis, Tenn	2	0	6	1	4	0	1	0	4	4	0	5
Missoula, Mont	0	0	1	0	0	0	2	0	0	0	0	2
Mobile, Ala	0	0	------	0	18	0	0	0	0	0	0	0
Nashville, Tenn	2	0	------	1	0	1	3	0	2	0	0	------
Newark, N. J	0	0	3	0	20	0	6	0	20	0	0	22
New Haven, Conn	0	0	------	0	60	0	1	0	1	0	0	2
New York, N Y	26	0	14	3	40	1	92	2	201	0	4	172
Philadelphia, Pa	2	0	2	3	16	0	36	0	142	0	1	40
Portland, Maine	0	0	------	0	9	0	2	0	4	0	0	0
Pueblo, Colo	0	0	------	0	52	0	2	0	7	0	0	0
Raleigh, N C	0	0	------	0	16	0	3	0	0	0	0	0
Reading, Pa	0	0	------	0	0	0	3	0	0	0	1	0
Sacramento, Calif	0	0	------	0	98	0	5	0	1	0	0	13
Saint Joseph, Mo	0	0	------	0	1	0	3	0	0	0	0	0
Saint Louis, Mo	0	0	3	1	61	2	7	0	18	0	1	5
Saint Paul, Minn	0	0	------	0	310	0	4	0	7	0	0	21
Salt Lake City, Utah	0	0	------	0	2	0	3	0	1	0	0	17
San Antonio, Tex	0	0	15	3	2	0	11	0	0	0	0	2
San Francisco, Calif	0	0	------	1	8	0	8	0	5	0	0	8
Savannah, Ga	0	0	34	1	47	0	1	0	1	0	0	0
Seattle, Wash	0	0	------	0	1	0	6	0	2	0	0	43
South Bend, Ind	0	0	------	0	0	0	1	0	18	0	0	0
Spokane, Wash	0	0	------	0	1	0	2	0	4	0	0	8
Springfield, Ill	0	0	------	0	42	0	2	0	4	0	0	0
Springfield, Mass	0	0	------	0	40	0	1	0	9	0	0	12
Syracuse, N Y	0	0	------	0	10	0	5	0	5	0	0	27
Tacoma, Wash	0	0	------	0	0	0	1	0	1	0	0	1
Tampa, Fla	0	0	------	0	0	0	2	0	0	0	0	0
Terre Haute, Ind	0	0	------	0	1	0	1	0	1	0	0	0
Washington, D. C	4	0	2	1	0	19	17	0	12	0	1	38
Wheeling, W. Va	0	0	------	0	0	0	3	0	0	0	0	0
Wichita, Kans	0	0	1	0	6	0	1	0	8	0	0	0
Wilmington, N. C	0	0	------	0	229	0	4	0	0	0	0	2
Winston-Salem, N. C	1	0	3	0	138	0	1	0	2	0	0	0
Worcester, Mass	0	0	------	0	9	0	8	0	9	0	0	37

Anthrax.—Case: Philadelphia, 1.
Dysentery, amebic.—Cases: Detroit, 1; New York, 1.
Dysentery, bacillary.—Cases: New York, 4; Syracuse, 2.
Typhus fever.—Cases: Atlanta, 1; San Antonio, 1.

Rates (annual basis) per 100,000 population for the group of 60 cities included in the preceding table (population 1942, 26,359,747)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Feb 14 1942	12 27	30 07	6 53	361 87	76 77	207 54	0 79	2 37	152 94
Average for week 1937-41	19 98	207 90	20 37	751 09	125 41	262 69	5 74	1 98	167 35

TERRITORIES AND POSSESSIONS

PANAMA CANAL ZONE

Notifiable diseases—October-December 1941 —During the months of October, November, and December 1941, certain notifiable diseases were reported in the Panama Canal Zone, including the terminal cities, as follows

Disease	October		November		December	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	5				13	
Diphtheria	19		7		14	1
Dysentery (amebic)	9		7	1	13	2
Dysentery (bacillary)	2	2	2	2	1	1
Leprosy	1			1		
Malaria	332	7	231	3	248	8
Measles	279	5	272		318	3
Meningitis meningococcus	2	1	3	2		
Mumps	3		5		3	
Paratyphoid fever			1		3	
Pneumonia	[1] 26	36	[1] 48	54	[1] 41	47
Scarlet fever	3				1	
Smallpox (alastrim)	4		6			
Tuberculosis	[1] 8	41	[1] 6	29	[1] 5	47
Typhoid fever	2			1	3	1
Whooping cough	[1] 4	3	[1] 5	5	[1] 8	4

[1] In the Canal Zone only

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended January 31, 1942.—During the week ended January 31, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		3	1	3	9		1	1	5	23
Chickenpox		5	1	211	551	58	29	13	155	1,023
Diphtheria	1	26	2	20	10	5				64
German measles				40	33	11	49	7	27	167
Influenza					20	10			79	109
Measles		1		628	166	172	48	35	30	1,080
Mumps		5		358	416	166	191	32	342	1,510
Pneumonia	1				7	3			24	35
Scarlet fever	3	18	4	170	323	37	43	46	13	657
Trachoma									1	1
Tuberculosis		1	14	110	44		2			171
Typhoid and paratyphoid fever			1	8	1					10
Undulant fever				1	1					2
Whooping cough				223	75	3	7	3	72	383
Other communicable diseases		6		2	231	86	2		12	339

CUBA

Habana—Communicable diseases—4 weeks ended February 7, 1942.—During the 4 weeks ended February 7, 1942, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	24	2	Scarlet fever	1	
Leprosy	1		Tuberculosis	6	2
Malaria	28	1	Typhoid fever	24	1
Measles	37				

SWEDEN

Notifiable diseases—October 1941.—During the month of October 1941, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	7	Poliomyelitis	162
Diphtheria	19	Scarlet fever	1,410
Dysentery	76	Syphilis	41
Epidemic encephalitis	3	Typhoid fever	11
Gonorrhea	1,072	Undulant fever	6
Paratyphoid fever	61		

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

Yellow Fever

Togoland—Hohoe.—On January 17, 1942, 1 fatal case of yellow fever was reported in Hohoe, Togoland.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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Public Health Reports

VOLUME 57 MARCH 13, 1942 NUMBER 11

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// Public Health Reports

Vol. 57 • MARCH 13, 1942 • *No. 11*

THE POLLEN CONCENTRATION OF THE ATMOSPHERE

By A. O. DAHL,[1] Ph. D., and R. V. ELLIS,[2] M. D.

That skin sensitivity and clinical sensitivity in hay fever do not always coincide is a well established fact. Consequently, accurate diagnosis of the cause or causes of hay fever for the individual patient is possible only when reliable data concerning the specific kinds of pollen present in the atmosphere during the period of symptoms are available.

In assembling data concerned with the pollen concentration of the air, two methods have been used. The first and older method, based solely upon field observations of the periods of bloom of the wind pollinated plants in question, supplies information purely presumptive in character. The second method, familiarized as the "pollen count," yields information of a more exact and clinically useful nature. When daily records are made, one can determine, by this method, the precise date on which a particular kind of pollen becomes an important element (i. e., potential irritant) in the atmosphere as well as the duration of the pollen season for the locality in which the observations are made. Obviously, field studies combined with microscopical analyses of the air are definitely desirable (cf. *9*).

Airy (*1*) apparently devised the method of exposing slides or plates coated with a sticky substance to catch particles, including pollen grains, settling out of the atmosphere. In his remarkable studies on hay fever, Blackley (*2*) exposed glycerin coated slides at ground levels and, with the aid of a kite, at levels up to approximately 1,000 feet above the ground. He compared the amount of pollen appearing on the slides during the 24-hour period with his own symptoms and found, in general, that the severity of his symptoms varied directly with the number of grains on the slide. This method of collecting data was

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much neglected from Blackley's time (1873) until it was revived by Scheppegrell (*15*) in 1917.

Essentially the same method of studying the pollen content of the air has been used in the not infrequent studies of recent years. The method consists of the exposure of a horizontally placed microscope slide to the atmosphere for 24 hours. Previous to exposure, the slide is coated with a viscous material such as oil (*7, 13, 14, 15, 17*) or glycerin (*15, 18*).

It seems reasonable to suppose that those periods during which the atmosphere contains appreciable quantities of a given kind of pollen may be considered as clinically important for patients sensitive to that particular pollen. Since Scheppegrell's contribution (*15*) relating to

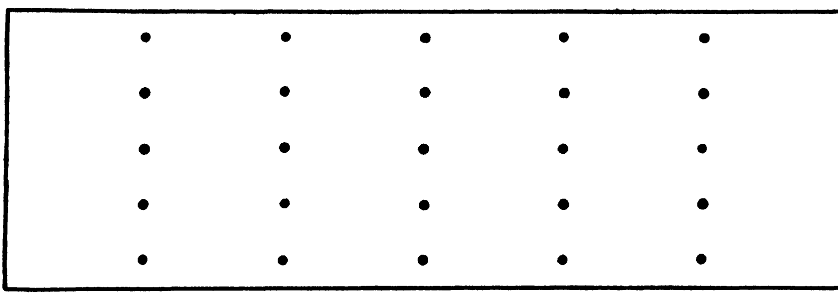

FIGURE 1.—Loci at which pollen grain counts may be made from an exposed slide Each dot represents a low power field

quantitative determinations of atmospheric pollen content, many investigators have preferred to express pollen concentration in approximate number of pollen grains per cubic yard of air We can see little reason for such preference except that values expressed in terms of volume seem somewhat more tangible, when related to human respiration, than do quantities recorded on the basis of the number of pollen grains per given unit of slide surface. Nevertheless, the latter value constitutes the basis for all calculated amounts of pollen per unit volume of air.

THE UNIT AREA BASIS

The number of pollen grains per square centimeter of surface of the exposed microscope slide may be determined either by direct observation or by derivation from the number of grains counted in 25 systematically distributed (see fig. 1) microscopic fields (low power, 100×) (*14*). The latter calculation may be made as follows.

Area of 1 microscopic field (low power) expressed in sq. mm. ×25 = total area examined (in sq. mm.).

Since 1 sq. cm. = 100 sq. mm., then

$$\frac{100}{\text{total area examined (in sq. mm.)}} = \text{factor (which may be designated } F_A\text{)}.$$

The product of this factor (F_A) and the number of pollen grains observed in 25 fields represents the approximate number of grains per square centimeter of exposed surface. Some workers (*13*) present their data on the basis of number of grains per square centimeter. Feinberg (*10*) has expressed the view that, of the bases available, the unit area basis represents the most practical standard.

THE VOLUMETRIC BASIS

Certain physical factors presented by Scheppegrell (*15*) were designed to enable the computation of the approximate number of pollen grains per cubic yard of air from the number of grains found on one square centimeter of the slide exposed for a 24-hour period. Several reports of recent years have used these factors as the basis for computations. Unfortunately, such reports are incorrect in regard to quantitative atmospheric pollen concentration, since it has been discovered (*5*) that Scheppegrell (*15*) (or, rather, J. H. Clo and C. C. Clark, who wrote the physical treatment for this paper) in applying Stokes' law made the error of using the diameter of pollen grains instead of the radius in calculating the velocity of fall The

TABLE 1

Diameter of pollen grain, in microns	Velocity of fall (ft. per sec)[1]			Factor F_B[2]		
	After Scheppegrell (*15*)	After Cocke (*5*)	Present calculation	After Scheppegrell (*15*)	After Cocke (*5*)	Present revision
10	0 040	0 01	0 010	7 3	29 1	29 3
12	058	.014	.014	5 0	20 8	20 3
14	079	.02	.019	3 7	16 6	14 9
15	091	- -	022	3 2	-	13 1
16	103	.026	.025	2 8	11 2	11 4
18	131	.03	032	2 2	9 7	9 0
20	161	04	.040	1 8	7 3	7 3
22	195	.049	.048	1 5	5 9	6 0
24	.232	058	057	1 3	5 0	5 1
25	.252	-	062	1 2	---	4 7
26	273	068	067	1 1	4 3	4 3
28	.316	079	078	9	3 7	3 7
30	.363	09	.089	.8	3 2	3 2
32	413	.10	.102	.7	2 9	2 9
34	466	11	.115	.6	2 7	2 5
36	.523	.13	.129	6	2 2	2 3
38	.582	.15	.143	.5	1 9	2 0
39	613	-	.151	.5	-- -	1 9
40	645	.16	.159	.5	1 8	1 8
42	.711	.18	.175	.4	1 6	1 7
44	.781	.20	.192	.4	1 5	1 5
46	.853	.21	.210	3	1 4	1 4
48	929	.23	.229	.3	1 3	1 3
50	1 008	.25	248	.3	1 2	1 2
60	1 452	36	.357	.2	8	.8
70	1 976	.47	486	.1	.6	.6
80	2 581	.64	.635	.1	.5	.5
90	3 267	-------	.804	.1	------ -	.4
100	4 033	-------	.992	.1	--------	.3

[1] These values were derived from Stokes' formula with the blanket assumption of a specific gravity of unity for all pollen grains (i e $d^1 - d^2 =$ ca 1) That this is not the case should be clear from discussion in the text Scheppegrell's values for V are untenable

[2] Factor $F_B \times N$ (number of pollen grains per sq cm) $= n$ (approximate number of pollen grains per cubic yd. of air). Scheppegrell's values for F_B are incorrect (see reference *5* and text)

incorrect values thus obtained were utilized further to establish a table of widely used factors. Cocke (*5*) reviewed the application of Stokes' law and, in pointing out the errors of the Scheppegrell formulae, has made an important contribution. It appears that quantitative values which have been obtained by the use of the Scheppegrell factors are approximately 25 percent of the values obtained when Cocke's (*5*) corrected factors are utilized.

We agree with Cocke (*5*) that if the practice of reporting the number of pollen grains per cubic yard of air is to continue, a standardized method for calculation is needed. Since Cocke (*5*) has proposed that his formulae be adopted as standard, it is regrettable to note certain errors in his calculations. It should be noted, in passing, that the two values given for v (velocity of fall in cm. per second) on pages 602 and 603 of his paper are in error and should read 4.84 and 1.210, respectively, instead of 0.484 and 0.115 Likewise, the velocity in feet per second (0.04) while reading correctly in itself is not derived, as specified (loc. cit.), from $\frac{0.115}{30}$ but rather from $\frac{1.210}{30}$. In table 1, page 604, there are also values with which we do not agree. For pollen of 14 microns diameter Cocke obtains 16.6 for the factor F_B, whereas we get 14.9 for this factor, indicating either a typographical error or a miscalculation. We find other smaller disagreements which we infer are due to differences in the handling of decimal places. In table 1 are given the factors V and F_B, indicated as follows: (*a*) Calculated according to Scheppegrell (*15*); (*b*) Cocke's (*5*) factors; and (*c*) our factors calculated according to Cocke's (loc. cit.) method. In the last case, the factor V was expressed in values having 6 decimal places, all of which were retained for calculating the F_B factor. The factor designated as F_B was obtained from the equation:

$$n = \frac{6.97 \times N}{V \times t}$$

where n is the approximate number of pollen grains per cubic yard of air, N the number of pollen grains per sq. cm. of surface of the exposed slide, V the velocity of fall of the pollen grain in feet per second (derived from Stokes' law), and t is time (24 hours). The derivation of this formula needs no description here since it has been adequately discussed by Cocke (*5*). The component V was converted into values in feet per second by multiplying the figures on a centimeter per second basis by 0.0328 (since 1 cm. = 0.0328 ft.). This is slightly at variance with the procedure of Scheppegrell and Cocke, both of whom regarded the component 6.97 as 7 and derived their velocity data on a foot per second basis by use of the denominator 30. Since the application of the volumetric factors yields only approximate data, it seems desirable in computing the factors to

avoid such approximations even though they be of small proportion. As indicated in table 1, the factors F_B, when multiplied by N, give the pollen concentration on the basis of approximate number of smooth pollen grains per cubic yard of air.

DISCUSSION

It may be well to point out that Stokes' formula gives the rate of fall, in centimeters per second, of a small sphere in a fluid medium. Eventually, a sphere attains a constant velocity when it falls under action of gravity through a viscous medium (*11*). Stokes' formula may be expressed as follows:

$$V = \frac{2gr^2(d_1 - d_2)}{9K}$$

where V represents velocity, g the acceleration of gravity (980 cm. per sec.), r the radius of the sphere (i. e. particle), d_1 and d_2 the densities of the sphere and medium, respectively, and K the coefficient of viscosity of the medium which, in this instance, may be taken to be 0.00018, the approximate coefficient of viscosity for air at temperatures of 20° to 23° C. (*11*).

Stokes (*16*) gave expression to his widely used formula in his consideration of the motion of a fluid about a sphere which itself moved uniformly with a small velocity. He illustrated his equation with the determination of the terminal velocity of a globule of water which formed part of a cloud. Burton (*3*), in studying the Brownian movement of silver particles in air, used Stokes' formula for calculating the velocity due to the force of gravitation.

One may question the propriety of omitting the density factors from Stokes' formula as both Scheppegrell and Cocke have done. Cocke (*5*) (p. 602) has said: "In using Stokes' law, Scheppegrell has assumed the density of pollen to be approximately one and, therefore, omitted the density factors (d_1 and d_2) entirely. Although the density for pollen has not been accurately determined, preliminary experiments indicate that it is close to unity. Thus, Scheppegrell's omission of the density factor is permissible." If the specific gravity of pollen (presumed in this case to be 1) were related to a value of 1 for the density of water, the density factor $(d_1 - d_2)$ in the above formula would become 1.0000000−0.0012046 or 0.9987954. The value used for d_2 is the specific gravity of air (as compared with that of water) at 20° C. (*12*). Obviously, on such a basis, the density factor can be considered as approximately 1. For example, the velocity of fall of a sphere 20 microns in diameter would be 1.2084 cm. per second utilizing this factor, and 1.2099 cm. disregarding it. However, there is little published information concerning the actual density of various kinds of

pollen. It appears from Thommen's report (*4*) (p. 550) of a weight of 5.323 grains for 1 cubic centimeter of untreated mature giant ragweed pollen as compared to a weight of 9.258 grains for 1 cc. of timothy pollen, that pollen of different species may well possess different densities. This matter receives more graphic demonstration if data from Dyakowska's (*8*) recent observations on the actual velocity of fall, in still air, of pollen from 18 different species of trees are utilized for calculating specific gravity values. Obviously, if the velocity of fall of smooth pollen grains be known, one may readily compute specific gravity from Stokes' formula. Such calculations are given in the fourth column of table 2. It should be noted that the specific gravity figures for these four pollens, all of which are of approximately the same size and contour, vary from 1.2 for yew (*Taxus* L.) to 1.7 for poplar (*Populus* L.).

TABLE 2

Pollen	Diameter [1] of pollen grain	V^1 in cm per sec	Specific gravity [2]	V in ft per sec	F_B	n [3]
Populus	25.4μ	3.39	1.741	0.111	2.616	523.2
Betula verrucosa	24.5μ	2.94	1.632	.096	3.025	605.0
Alnus glutinosa	24.6μ	2.77	1.517	.091	3.191	638.2
Taxus baccata	25.2μ	2.30	1.197	.075	3.872	774.4
Average	24.9μ	2.85	1.522	.093	3.176	635.2
Calculated	25μ	1.89	1.003	.062	4.691	938.2

[1] From Dyakowska (*8*) average and calculated values excepted
[2] Calculated from Stokes' (*16*) formula
[3] When N = 200

In addition, there are other factors which may be responsible for variations in the recorded results of different investigators. As Scheppegrell (*15*) and Cocke (*5*) have noted, the formulae derived from Stokes' law apply to smooth spheres only and cannot be accurately applied to echinate, winged, and otherwise irregular pollen grains, which obviously offer greater air resistance, unless some correctional factor is introduced. Certainly there is no tangible basis, at present, from which such a correctional factor can be derived. With respect to ragweed pollen, an important example of the echinate type, Cocke (*5*) remarks: "Since ragweed is spiculated, it would seem conservative to add 25 percent to this figure." However, no basis for this 25 percent (33⅓ percent in a later (*6*) communication) increase is given.

It must be admitted that we have, as yet, no means of calculating the velocity of fall of echinate pollen, such as that of ragweed. In this connection, we may again refer to Dyakowska's (*8*) researches. Amplification of such studies would directly yield the velocity of fall of various kinds of grains, including those with spiny surfaces, and there would, then, be a far more adequate basis upon which to devise

factors for calculating the approximate number of pollen grains per cubic yard of air. This seems entirely evident if Miss Dyakowska's velocity data are utilized in calculating the F_B factor. There are listed in her table 3 (loc. cit.) four different plants (poplar (*Populus*), birch (*Betula verrucosa* Ehrh.), alder (*Alnus* L.), and yew (*Taxus*)) having pollen grains approximately 25μ in diameter. For these, the velocity of fall, as observed by Miss Dyakowska, varies from 0.075 to 0.111 ft. per second (see table 2) whereas the calculated velocity for a sphere 25μ in diameter is 0.062 ft. per second (see table 1). Further, the F_B factors now vary from 2.6 for poplar to 3.9 for yew, whereas the calculated F_B factor is 4.7 for a grain of this size. The last column in table 2 indicates what the pollen concentration (in pollen grains per cubic yard of air) would be if 200 grains of each kind were found in 1 square centimeter of surface of an exposed slide. The use of the calculated F_B factor would give approximately 938 pollen grains per cubic yard of air, which is 17.5 percent in excess of the value for yew (774) and 44.2 percent in excess of the value for poplar (523). It is of interest, also, to note that the winged pollen grain of pine (*Pinus montana* Mill), with a diameter of 66.6μ, falls at approximately one-half the velocity recorded for the unwinged pollen (diameter 35.4μ) of European hornbeam (*Carpinus betulus* L.). Such comparisons indicate that adequate velocity and specific gravity data must be available before accurate volumetric factors can be devised.

Another factor which may give rise to variability in quantitative results in applying the above formulae is that of pollen grain size. Pollen grains of a given species vary within certain limits and measurements recorded in the literature consequently show some variability. The use of different mounting media, as well as the utilization of both living and dried pollens for specimen slides, likewise may contribute to disparate measurements. Suppose, for example, that on the same day two independent investigators obtain a count of 200 grains of ragweed pollen per square centimeter of surface. If investigator A chooses 16μ (*5*) as the diameter for this pollen, he would by calculation (200$\times$11.2) obtain 2,240 grains per cubic yard of air. If investigator B considers 20μ as the diameter, he would record 1,460 (200$\times$7.3) grains per cubic yard of air, which is about one-third less than A obtained, although the number of pollen grains per unit of area was the same in each case. If the region of observation were one in which common, giant, and western ragweeds occurred (e. g., Minnesota), the record of investigator B would be the more accurate, since the average pollen grain diameter for the group would be approximately 19.7μ. The pollen grain size (diameter) for ragweeds (*Ambrosia* (Tourn.) L.) as derived from Wodehouse's (*18*) observations on ten different species varies from approximately 16.5μ

to 28.5μ with an average of 20.3μ. Obviously, for the sake of uniformity, agreement upon the size of pollen grains for the purpose of such volumetric computations is necessary.

It seems evident from the foregoing considerations that data concerning atmospheric pollen concentration can be most accurately expressed on the basis of number of pollen grains per unit of surface. Further, it should be emphasized that the revised values for the factors V and F_B given in table 1 are primarily intended to supplant those which are in error in published communications. The lack of exact values for the specific gravity of various pollens, as well as the existence of such complicating factors as variable air currents, lead us to favor the unit area basis for expression of pollen data.

SUMMARY

It seems evident from a review of the available methods of computing pollen concentration of the atmosphere that those which utilize volumetric factors derived from Stokes' law are less accurate than those methods which employ a unit area basis.

The less desirable character of the volumetric method is, in part, due to the fact that data concerning specific gravity and velocity of fall of pollen grains, of both smooth and echinate types, are at present inadequate.

Certain minor errors in published factors devised for purposes of calculating the number of pollen grains per cubic yard of air are pointed out.

It is to be desired that reports should include a record of the amount of pollen per unit of area of the exposed slide, whether volumetric data are computed or not.

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THE INCIDENCE OF CANCER IN BIRMINGHAM AND JEFFERSON COUNTY, ALABAMA, 1938 [1]

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Previous studies in this series have reported cancer incidence and prevalence in various selected communities of different geographic and economic characteristics in the United States (*1–6*). This paper presents the results of an investigation into the nature and amount of cancer in a highly industrialized southern area during the calendar year 1938. The area surveyed [2] consisted of the city of Birmingham, Ala., and the remainder of Jefferson County.

The first paper of the series (*1*) discussed in detail the general purpose of these cancer incidence studies, the nature of the data sought, and the technique employed in collecting the data. It is sufficient to state here that all physicians, hospitals, and clinics in the survey area were requested to furnish records of all patients treated or observed for any malignant growth during the calendar year 1938. The information obtained permitted the identification of cases which had been reported by more than one source, and the separation of resident and nonresident cases.

The survey attempted to locate and obtain records from 425 physicians, listed by various sources as practicing in Jefferson County, but 61 of these had died, retired, or moved away. Of the 364 who were located, none refused to submit a report. Twenty-seven submitted joint reports with other physicians, and 156 reported that they had neither seen nor treated any cancer cases during the study year.

[1] From the Division of Public Health Methods, National Institute of Health. Data for this study were collected under the supervision of Bernard A. Koteen. Miss Bess A. Cheney was in immediate charge of the tabulation of the data, which was done as a project, No. 65-2-23-356, of the Work Projects Administration. The entire survey was directed by Harold F. Dorn.

[2] Throughout this paper the entire survey area will be referred to as either Birmingham or Jefferson County.

Hence, cases were reported by 181 of the physicians. Nineteen hospitals returned schedules.

A very small proportion of the doctors and hospitals had treated most of the cancer patients in Birmingham, indicating that the treatment of cancer is a highly specialized field (table 1). Most of the cancer patients in a community are usually referred to dermatologists, radiologists, roentgenologists, and surgeons. Very few cases are treated by pediatricians, obstetricians, etc. The nature of a doctor's specialty will thus usually determine whether or not he will see many cancer cases. Three doctors, only 0.9 percent of the total number of doctors reporting, accounted for 728 cases, or 52.3 percent of the total number of cases reported by doctors. On the other hand, 156 doctors, almost half of the total doctors reporting, had neither seen nor treated any cancer cases in 1938. Three of the hospitals reported a total of 483 cases, or 65.1 percent of all cases reported by hospitals.

TABLE 1 — *Numbers and percentages of doctors and hospitals reporting cases of cancer and numbers and percentages of cases so submitted, Birmingham, Ala., 1938*

Number of cases reported by each	Number reporting		Percent reporting		Actual number of cases reported [2]			Percentage of cases reported		
	Doctors	Hospitals	Doctors	Hospitals	Doctors	Hospitals	All sources	Doctors	Hospitals	All sources
0	156	7	46.3	36.8	0	0	0			
1-5	118	2	43.9	10.5	309	4	313	22.2	0.5	14.7
6-10	19	2	5.6	10.5	140	20	160	10.1	2.7	7.5
11-20	8	2	2.4	10.5	117	26	143	8.4	3.5	6.7
21-40	3	0	.9		97	0	97	7.0		4.5
41-100	0	3		15.8	0	209	209		28.2	9.8
Over 100	3	3	.9	15.8	728	483	1,211	52.3	65.1	56.8
Total reporting	[1] 337	19	100.0	100.0	1,391	742	2,133	100.0	100.0	100.0

[1] This figure excludes 27 doctors who submitted joint reports with other doctors.
[2] This is the actual number of cases reported, before duplicate reports of the same case had been identified and eliminated.

After the patients for whom more than one report had been received were identified, all cases were tabulated according to the nature and the number of reporting sources. Table 2 shows that 82 percent of the cases had been seen by one source only, and the remaining 18 percent had been seen by two or more respondents. Females were seen by two or more sources more frequently than males. Of the female cases, 21 percent were seen by two or more sources, whereas only 14 percent of the male cases were seen by more than one source. Colored patients, limited for the most part to clinic treatment, were seen by only one reporting source in a greater percentage of cases than were white. The percentages of cases reported from hospitals only were 24 and 25 for white males and females, respectively, and 65 and 57 for colored males and females, respectively.

Obviously, a case treated by a physician in a hospital may have been reported both on the hospital's and physician's schedules. Thus the group in table 2, "Both hospitals and doctors", includes some cases of this sort, as well as cases that were treated by a physician in private practice and subsequently referred by him to a hospital. The group "Doctor(s) only" includes only cases not reported by hospitals. It was assumed that these cases were treated by the physician in his private office or home.

TABLE 2.—*Percentage of all cancer cases, by sex and color, reported by various sources, according to nature and number of reporting agencies, Birmingham, Ala., 1938*

Reported by—	Percentage of cases reported						
	Total	Total by sex		White		Colored	
		Male	Female	Male	Female	Male	Female
Hospital(s) only	29	27	30	24	25	65	57
Doctor(s) only	59	64	56	67	61	23	28
Both hospital(s) and doctor(s)	12	9	14	9	14	12	15
Total	100	100	100	100	100	100	100
1 source only	82	86	79	86	78	89	83
2 sources only	14	10	16	10	17	9	12
3 or more sources	4	4	5	4	5	2	5
Total	100	100	100	100	100	100	100

Fifty-nine percent of all the cases (both sexes, both colors) were seen only by doctors; 29 percent were seen only by hospitals, and 12 percent were seen by both doctors and hospitals.[3] There was a smaller proportion of cases reported by hospitals only in this area than in the cities previously studied (table 3).

In these cities the percentages seen by hospitals only ranged from 40 in Pittsburgh to 68 in New Orleans. Patients who had not been seen by hospitals at any time in the course of their treatment formed 59 percent of the cases in Birmingham, 37 percent in Pittsburgh, and only 22 percent in New Orleans (fig. 1).

TABLE 3.—*Distribution of cancer cases according to nature of reporting source: Birmingham, Ala., 1938; Pittsburgh, Pa.; Atlanta, Ga.; Chicago, Ill.; and New Orleans, La.; 1937*

Reported by—	Percentage				
	Birmingham	Pittsburgh	Atlanta	Chicago	New Orleans
Physicians only	59	37	36	30	22
Hospitals only	29	40	52	59	68
Both hospitals and physicians	12	23	12	11	10
Total	100	100	100	100	100

[3] Since 87 percent of the cases reported were white, the distribution according to reporting source of the total cases is heavily weighted by the preponderance of white cases seen by doctors only

Limited hospital and clinic facilities may account for this atypical distribution in Birmingham, and, if this is so, it follows that rates computed on the basis of diagnosed cases are more inaccurate as indices of cancer prevalence in this area than in the areas previously surveyed. If medical facilities designed to reach persons on every economic level are not present or are inadequate in a community, a

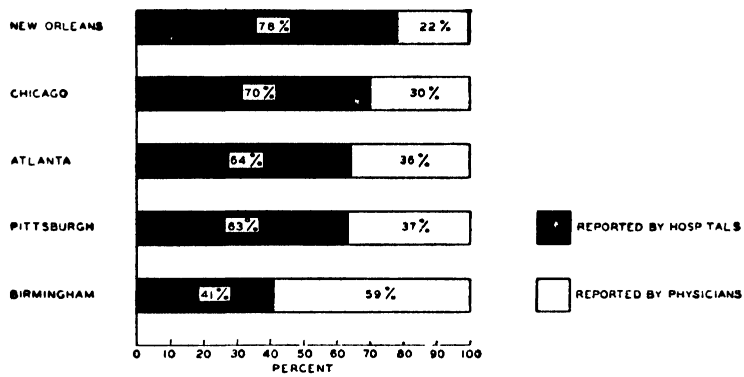

FIGURE 1.—Distribution of cancer cases according to nature of reporting source in five surveyed areas, Cancer Incidence Survey, 1937, 1938, and 1939.

large proportion of the cases of cancer will remain undiagnosed throughout the course of the disease.

In evaluating cancer incidence data, it is also important to consider the accuracy of the diagnosis of the reported cases. The method of confirmation of diagnosis was obtained for each case in this survey, and all cases reported are listed in tables 4 and 5 according to whether the confirmation was by microscopic examination of tissue.

TABLE 4.—*Number and percentage of cases with a microscopically confirmed diagnosis, and whether or not reported by a hospital, Birmingham, Ala., 1938*

Agency	Total number of cases	Cases with microscopic diagnosis	Percentage
Hospital	709	403	56.8
Physicians only	1,016	309	30.4
Total	1,725	712	41.3

It will be observed that of the 1,016 cases seen only by physicians (in their private practice), 309, or 30.4 percent, received microscopic confirmation of diagnosis, while a much larger proportion of hospital cases, 403 out of 709,[4] or 56.8 percent, received microscopic confirmation. The comparative infrequency of microscopic confirmation of diagnoses by physicians is of considerable importance in view of the

[4] Of these 709 cases seen by hospitals 207 were also reported by physicians. The two groups are, therefore, not strictly comparable.

fact that three-fifths of all cases were reported by physicians only. The diagnosis of 41.3 percent of all cases reported in Birmingham was confirmed microscopically. In the preceding studies, the percentages found were as follows: New Orleans, 51.7; Atlanta, 52.2; Pittsburgh, 62.0; Chicago, 69.7; and Detroit, 78.0. The very low percentage for Birmingham can be accounted for partly by the high proportion of cases seen only by physicians, as pointed out above, and partly by the high incidence in the South of cancers of the skin and buccal cavity. Malignancies of the skin and buccal cavity, while easily accessible for biopsy purposes, usually have a very small proportion of diagnoses confirmed by tissue examination. Many dermatologists feel that microscopic diagnosis of skin cancers is superfluous and that, where surgical treatment is not indicated, the removal of the tissue specimen might cause unnecessary disfiguration.

TABLE 5.—*Number and percentage of cases of cancer with a microscopically confirmed diagnosis, by primary site and whether or not reported by a hospital, Birmingham, Ala., 1938*

Primary site	Cases reported by hospitals		Cases reported only by a doctor		All cases reported		Percentage reported by microscopic diagnosis		
	Microscopic	Total	Microscopic	Total	Microscopic	Total	Hospital	Doctor only	All cases
Buccal cavity	17	38	24	104	41	142	44.7	23.1	28.9
Digestive tract	61	111	49	109	110	220	55.0	45.0	50.0
Respiratory system	9	14	7	13	16	27	64.3	53.8	59.3
Genito-urinary system	181	281	103	185	284	466	64.4	55.7	60.9
Breast	69	97	75	128	144	225	71.1	58.6	64.0
Skin	26	109	31	413	57	522	23.9	7.5	10.9
Brain	5	7	--	--	5	7	71.4	-	71.4
Bones	5	8	3	14	8	2	62.5	21.4	36.4
All others	30	44	17	50	47	94	68.2	34.0	50.0
All sites	403	709	309	1,016	712	1,725	56.8	30.4	41.3

More than one-third of all the cases reported in Birmingham were skin cancers, and of these only 11 percent were microscopically diagnosed (table 5). The diagnoses of cancers of sites other than skin were confirmed microscopically in 54 percent of the cases. In the two other southern cities studied, Atlanta and New Orleans, the proportion of confirmed diagnoses was higher both for skin and nonskin cases. The percentages in Atlanta were 21 for skin cancers and 64 for all other cancers; in New Orleans the percentages were 39 and 55.

The population of Jefferson County was estimated to be 454,150 [5] as of June 30, 1938. Hospitals and physicians in this area reported 1.725 cases of cancer for the year 1938. Of these, 1,057 were resident cases and 668 were nonresident. There were 354 death certificates listing cancer as a cause of death filed in the area during 1938, of

[5] This figure was arrived at by interpolation between the figure of 458,956, obtained from a preliminary population report released by the Bureau of the Census on September 4, 1940, and the 1930 census population of 431,493.

which 318 were residents. In this latter number there were death certificates for 46 residents who had not been reported by hospitals or physicians. These 46, added to the above 1,057, make the total number of resident cases 1,103. The total number of cases, resident and nonresident, obtained by the survey thus becomes 1,771. The resident case rate was 242.9 per 100,000, and the death rate 70.0 per 100,000. The case rate will be considered in detail in a later section of the paper.

TABLE 6.—*Total number of cancer cases reported, including death certificates not reported as a case, and total number of death certificates showing cancer as a cause of death, by residence, Birmingham, Ala., 1938*

	Cases reported by hospitals and physicians	Death certificates not reported as a case	All cases	Total death certificates
Resident	[1] 1, 057	46	1, 103	318
Nonresident	668	------- ---	668	36
Total	1, 725	46	1, 771	354

[1] Includes 8 cases of unknown residence

In Birmingham, as in the other areas surveyed, the hospitals and physicians were requested to report the age of each patient. Unfortunately, the age of a great number of the patients in this area (29 percent) was reported as unknown (table 7). In view of this, any detailed discussion of age distributions is precluded. However, it can be stated that the relative frequency of cancer at each age follows the same pattern as that found in other survey areas.

TABLE 7.—*Number and percentage distribution by age and sex of all cancer cases, Birmingham, Ala , 1938*

Age group	Percentage			Number of cases		
	Total	Male	Female	Total	Male	Female
Under 10	0 2	0 3	0 2	4	2	2
10-19	1 1	1 3	1 0	19	9	10
20 29	2 1	2 0	2 3	37	14	23
30-39	7 6	3 4	10 5	131	24	107
40-49	15 0	10 2	18 3	259	72	187
50-59	17 0	13 5	19 4	293	95	198
60 69	17 0	18 4	16 1	294	130	164
70-79	8 9	10 9	7 5	153	77	76
80 and over	2.1	2 8	1 6	36	20	16
Unknown	29 0	37.2	23 1	499	262	237
Total	100 0	100 0	100 0	1, 725	705	1, 020

Table 8 shows the relative frequency with which malignancies of certain primary sites occurred among the reported cases. In order of importance, these sites were: Skin, buccal cavity, digestive tract, and genito-urinary system. An extremely high proportion of cancers among white males (46.1) were primary in the skin. This percentage is greater than the corresponding percentages for Atlanta and New Orleans, 38.5 and 29.2 percent, respectively. With this exception.

there were no significant differences among the site distributions in white males in Birmingham, Atlanta, and New Orleans.

In view of the small number of cases among colored males reported in Jefferson County, the site distribution for these cases is probably not very reliable as an indication of the distribution of cases actually existing in the population.

TABLE 8.—*Percentage distribution of the total reported cancer cases, by primary site, sex, and color, Birmingham, Ala., 1938*

Primary site	Total		White		Colored	
	Male	Female	Male	Female	Male	Female
Buccal cavity, pharynx	15.0	3 5	16 0	4 0	3 7	1.2
Lip	9 8	1 6	10 4	1 9	1.9	
Tongue	1.4	.4	1 5	.4		.6
Mouth	.3	.2	.3	.1		.6
Jaw	6		.5		1 9	
Pharynx	.1	2	.2	.2		
Others	2 8	1 2	3 1	1 4		
Digestive tract	15.5	10 9	13.2	10 6	42 6	12 2
Esophagus	4	1	.3		1 9	6
Stomach, duodenum	5 2	2 5	4 0	2.2	20 4	4 1
Intestines	3 4	3 6	3 4	4 0	3 7	1 7
Rectum, anus	3.3	2.5	2.6	2 6	11.1	2 3
Liver, biliary passages	2 3	1.2	2 0	.9	5.6	2 3
Pancreas	.7	.7	8	.6		1 2
Mesentery, peritoneum	1	.2	.2	.2		
Respiratory system	2 6	.9	2.5	.8	3.7	1 2
Larynx	7	.2	.8	.2		
Lungs, pleura	1.6	.6	1.5	.5	1.9	1 2
Others	.3	.1	2	.1	1 9	
Genito-urinary system	12 8	36 9	12 3	32 4	18.5	58 7
Uterus		31 5		26.4		50 4
Kidneys	1.1	.8	.9	.9	3.7	
Bladder	1 3	.7	1.4	.7		.6
Prostate	8 8		8 6		11 1	
Others	1 6	3 9	1.4	4 4	3 7	1 7
Breast	7	21.6	.5	21 6	3 7	21 5
Skin	43 3	21 3	46.1	24 9	9.3	3 5
Brain	7	2	.8	2		
Bones (except jaw)	1 7	1 0	1 7	9	1 9	1 2
Others	7 8	3 8	7.1	4 5	16 7	.6
Total	100 0	100 0	100 0	100 0	100 0	100 0

Four primary sites accounted for 90 percent of the cases among white females in Birmingham: Genito-urinary system, 32.4 percent; skin, 24.9 percent; breast, 21.6 percent; digestive tract, 10.6 percent. These frequencies closely approximate those found for white females in Atlanta and New Orleans.

The distribution of cases among colored females in Birmingham is similar to that among white females except that a much smaller proportion of skin cancers and a correspondingly greater percentage of genito-urinary cancers are found among the former group (fig. 2).

From the incidence data collected by these surveys, it has been possible to compute three different indices of cancer prevalence. These indices, in the order in which they are presented in table 9, are the prevalence rate, the prevalence rate for treated cases, and the incidence rate.[6]

The prevalence rate is based on all cancer cases existing in the

[6] Of course, only the resident cases were considered in computing these three rates.

population during a given period of time, regardless of the date of onset (or first diagnosis). All cases, whether diagnosed, treated, or observed for cancer during 1938, were included in the computation of this rate for Birmingham.

The prevalence rate for treated cases only is based on only those cases which actually received treatment during 1938. The advantage

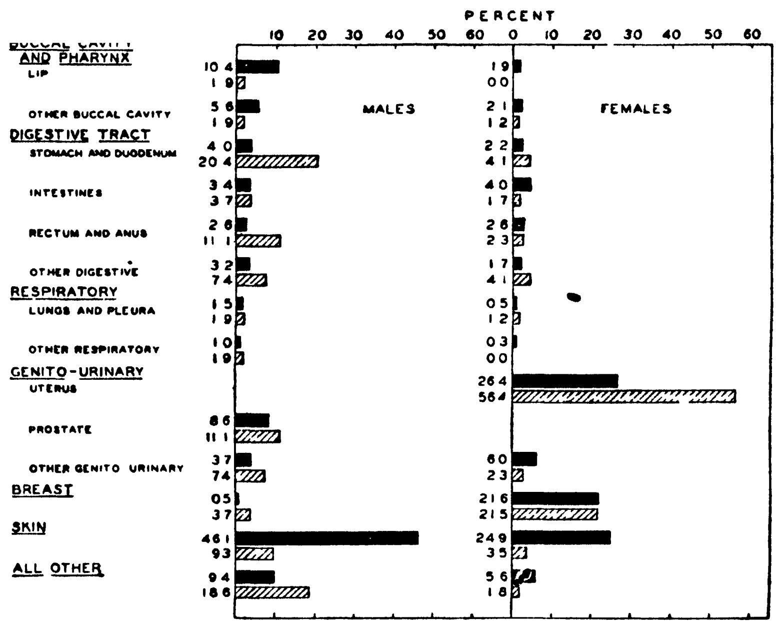

FIGURE 2.—Percentage distribution of cases of cancer by primary site, sex, and color, Birmingham, Ala 1938

of this rate over the prevalence rate of all reported cases is that it excludes cases that were only observed during 1938, and consequently is not affected by the varying thoroughness with which cases of cancer of different sites are observed after they are considered cured, and with which cured cases are kept under medical observation in different areas.

The last of these rates, the incidence rate, relates only to those cases which were reported as having been first diagnosed during 1938, i. e., cases which originated during the study year. It excludes all others, even though they may have received treatment during this period.

The Birmingham cancer prevalence rate, as found in the present survey, was 242.9 per 100,000 persons. It is the lowest rate reported for the cities studied, which is surprising in view of the high prevalence rates generally reported for the South as compared with the North.[7]

[7] In stating that cancer prevalence rates for the South are higher than for the North, we have not lost sight of the fact that there is considerable variation in the rates within these two geographic areas. (See table 9.)

TABLE 9.—*Crude resident rates of cancer per 100,000 persons, Cancer Incidence Survey, 1937, 1938, and 1939* [1]

Area surveyed	Resident prevalence rate [2]	Area surveyed	Resident prevalence rate for treated cases only	Area surveyed	Resident incidence rate
San Francisco	525.9	Denver	428.9	New Orleans	312.6
Denver	518.2	San Francisco	410.2	Denver	286.6
Philadelphia	474.2	New Orleans	387.1	San Francisco	283.4
New Orleans	427.1	Philadelphia	359.6	Dallas-Fort Worth	255.4
Dallas-Fort Worth	394.0	Dallas-Fort Worth	352.1	Philadelphia	233.8
Atlanta	389.7	Atlanta	273.7	Atlanta	196.7
Chicago	344.9	Chicago	272.6	Chicago	195.8
Pittsburgh	332.4	Pittsburgh	249.9	Pittsburgh	179.3
Detroit	282.6	Detroit	215.5	Birmingham	139.4
Birmingham	242.9	Birmingham	205.7	Detroit	138.9

[1] Atlanta, Chicago, Pittsburgh, Detroit, and New Orleans were surveyed in 1937, San Francisco, Birmingham, Dallas-Fort Worth, and Philadelphia in 1938, and Denver in 1939.
[2] While the prevalence rates were computed on the basis of reported resident cases plus recorded resident deaths not reported as cases, the treated case rates and incidence rates were computed only for reported cases. Obviously, no data as to treatment or date of first diagnosis could be obtained from death certificates alone.

However, the low prevalence rate in Birmingham can be accounted for in part by the relatively small percentage of cases kept under observation, as indicated by the data in column A of table 10. The rate of prevalence of treated cases only, computed to eliminate the influence of the cases under observation, is also lower in Birmingham than in the other cities (table 9).

The proportion of the total resident cases that were first diagnosed as cancerous in the study year is presented in column B, table 10. This proportion for Birmingham ranks very high among the areas. In other words, a very small proportion of the total cases reported in Birmingham had been carried over from preceding years.

TABLE 10.—*Percentages of total reported resident cases that were under observation only during study year, and percentages that were first diagnosed as cancerous during the study year, Cancer Incidence Survey, 1937, 1938, 1939*

Area	Percentage		Area	Percentage	
	(A) Under observation only during study year	(B) First diagnosis during study year		(A) Under observation only during study year	(B) First diagnosis during study year
Birmingham	11.6	59.9	Dallas and Fort Worth	9.8	65.4
Detroit	20.6	51.1	San Francisco and Alameda Counties	10.6	55.5
Pittsburgh	14.8	61.1	Denver	15.3	56.0
Chicago	5.8	67.6	New Orleans	5.4	76.4
Atlanta	26.6	52.8			
Philadelphia	17.9	53.4			

It is possible that the cancer incidence rate in Birmingham as reported (139.4) is unduly low. However, inasmuch as the data are necessarily limited to diagnosed cases, there is no way of determining how many cases never came to medical attention. In addition to

this, the very low rate for Birmingham may be attributed to one or more of the following factors, but the relative weight which should be given to each must remain in doubt.

The population of Birmingham may be a relatively young one,[9] with a consequent low incidence of cancer. Low incidence may also

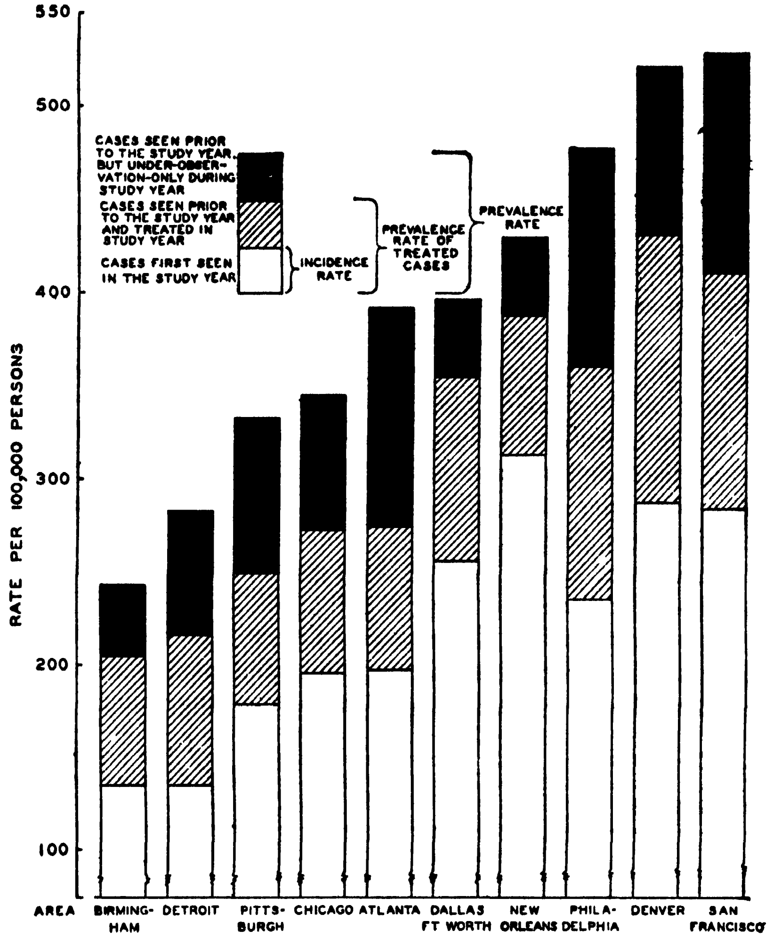

FIGURE 3.—Crude resident rates per 100,000 persons, by areas surveyed, Cancer Incidence Survey, 1937, 1938, and 1939.

result from special climatic conditions prevailing in Birmingham. Furthermore, the proportion of the total cases in Birmingham which had been treated by hospitals and clinics was very small (tables 2 and 3), indicating the possibility of a shortage in institutional facilities.

[9] The Bureau of the Census has not yet released 1940 populations by age. This will be done in the near future, and the point can then be either verified or disproved.

TABLE 11.—*Number of resident cancer cases per 100,000 persons, by primary site, sex, and color, Birmingham, Ala., 1938*

	Total[1]			White			Colored		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Buccal cavity	17.0	25.5	8.7	20.3	39.5	13.5	2.3	3.4	1.1
Digestive tract	39.0	39.3	38.6	47.6	47.6	47.6	25.5	26.4	24.5
Respiratory system	5.3	6.7	3.9	7.2	9.5	5.0	2.3	2.3	2.2
Genito-urinary system	72.2	22.3	120.7	81.8	30.7	131.5	57.1	9.2	103.7
Breast	35.0	1.8	67.3	45.1	2.2	86.7	19.2	1.1	36.3
Skin	56.1	65.7	46.9	88.3	103.9	73.2	5.7	5.7	5.6
Brain	.4	.4	.4	.7	.7	7	-----	--------	------
Bones	1.5	.9	2.2	2.2	1.5	2.8	.6	--------	1.1
All others	14.5	16.5	12.6	20.2	20.5	19.9	5.7	10.3	1.1
All sites	241.1	179.2	301.2	319.5	256.1	381.0	118.2	58.5	176.2

[1] Excludes 7 cases of unknown residence; previously these were included.

Table 11 presents the crude prevalence rates per 100,000 persons in Birmingham, by primary site, sex, and color. It is apparent that the rates for white persons are much higher at each site, as well as for all sites combined. The most striking differences are to be found between the case rates of skin and buccal cavity cancer for the white and colored populations. However, even though the prevalence of skin and buccal cavity cancer is very much greater among whites than colored, it cannot be said that the higher prevalence rate for whites generally is to be ascribed to the difference in the numbers of cases of these sites reported. When all sites exclusive of skin and buccal cavity are considered, the rate for white males is 113 per 100,000, for colored males only 50 per 100,000; the rate for white females is 304 per 100,000, for colored females only 170 per 100,000. The extent to which these differences result from more actual cancer or from more diagnosed cancer among whites is unknown. Both possibilities, however, must be taken into account in considering racial differences in the prevalence of cancer (fig. 4).

The most important sites among white males were skin (103.9 per 100,000), digestive tract (47.6 per 100,000), and buccal cavity (39.5 per 100,000). Cancer prevalence among white females was much higher than among white males. The highest rate among females was for genito-urinary cancer (131.5 per 100,000), and the next highest was for breast cancer (86.7 per 100,000). Skin cancer, the most common type of cancer among white males, was the third most frequent among white females (73.2 per 100,000).

The incidence rates for Birmingham, by site, sex, and color, are shown in table 12. Comparison of these rates with the corresponding prevalence rates reveals that, while the incidence rates are lower (as they must be), they are not lower in equal proportions for each site.

TABLE 12.—*Number of resident cancer cases first seen in 1938, per 100,000 persons by primary site, sex, and color, Birmingham, Ala., 1938*

Primary site	Total			White			Colored		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Buccal cavity	9 5	14 3	5 2	14 8	22 7	7 8	1 1	1 1	1 1
Digestive tract	26 0	26 8	25 2	30 3	32 2	28 4	19 2	18 4	20 1
Respiratory system	4 0	5 8	2 2	5 0	8 0	2 1	2 3	2 3	2 2
Genito urinary system	42 9	14 7	70 3	46 5	19 8	72 5	37 3	6 9	66 9
Breast	14 8	9	28 2	15 5	1 5	29 1	13 6		26 8
Skin	31 7	34 9	28 6	48 7	54 2	43 4	5 1	4 6	5 6
Brain	4	4	4	7	7	7			
Bones	9	9	9	1 1	1 5	7	6		1 1
All others	9 2	12 1	6 1	13 3	16 1	10 0	2 8	5 7	
All sites	139 4	110 8	167 1	176 0	156 6	194 7	82 0	39 0	123 8

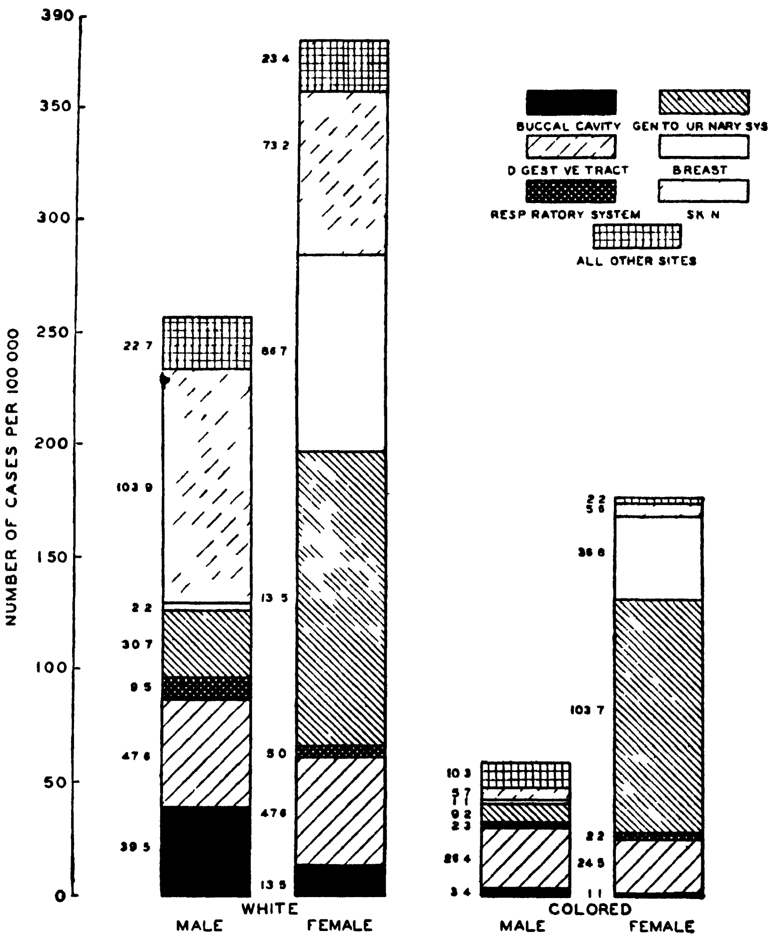

FIGURE 4.—Number of cancer cases of each primary site per 100 000 persons, by sex and color, Birmingham, Ala., 1938

In order to determine what segment of the cancer prevalence in Birmingham was composed of cases first seen during the study year, the ratio of the new cases to the total resident cases was computed (table 13). Obviously, this ratio also indicates the proportion of the cases receiving medical care or observation which had been carried over into the study year from previous years.

Of the 1,095 resident cases of cancer seen or treated in Birmingham during the study year, 633, or 58 percent, were first diagnosed during that year. Sixty-two percent of the total cases among males originated during the study year, as against only 56 percent of the total cases among females.

TABLE 13.—*Percentage of total reported cancer cases which were first seen in 1938, resident cases only, by site, sex, and color, Birmingham, Ala., 1938*

Primary site	Total			White			Colored		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Buccal cavity	55.8	56.1	60.0	56.2	57.4	57.9	50.0	33.3	100.0
Digestive tract	66.7	68.2	65.2	63.6	67.7	59.7	75.6	69.6	81.8
Respiratory system	75.0	86.7	55.6	70.0	84.6	42.9	100.0	100.0	100.0
Genito-urinary system	59.5	66.0	58.3	56.8	64.3	55.1	65.3	75.0	64.5
Breast	42.1	50.0	41.9	34.4	66.7	33.6	70.6	--	72.7
Skin	56.5	53.1	61.1	55.1	52.1	59.2	90.0	80.0	100.0
Brain	100.0	100.0	100.0	100.0	100.0	100.0	-	-	-
Bones	57.2	100.0	40.0	50.0	100.0	25.0	100.0	-	100.0
All others	63.6	73.0	48.3	66.1	78.6	50.0	50.0	55.6	-
All sites	57.8	61.8	55.5	55.1	61.1	51.1	69.4	66.7	70.3

There were 173 cases which had received no treatment during 1938, and of these 125, or 72 percent, were females. When these 173 cases are excluded, leaving only cases which received treatment in the study year, the proportion of the treated cases among males originating in the study year is 70 percent, and the proportion of those among females is 68 percent. Thus, while there is a difference between the proportions of male and female cases carried over into the study year, the difference arises largely from the fact that the female cases generally remain under observation longer after treatment has been concluded.

Distinct differences are to be observed among the proportions of cases originating in the study year for each primary site. Eighty-seven percent of the male respiratory system cases, 68 percent of the male digestive tract cases, and 65 percent of the female digestive tract cases were first diagnosed during the study year, in contrast to the 53 percent of the male skin cases[10] and 42 percent of the female breast cases which were first diagnosed during that period. These

[10] The very small number of male cases that were observed only in 1938 makes it doubtful if all cured and arrested male skin cancer had been kept under observation for any extended period of time Had they been, the percentage of male skin cases first seen in 1938 would probably have been much smaller.

proportions indicate clearly that in cancer of sites less susceptible to successful treatment the cases reported are largely new cases.

Female breast cases provided the greatest difference between white and colored cases (where any significant number of cases was involved) in proportions carried over from preceding years. Only 34 percent of the white female breast cases were first seen during 1938, while 73 percent of the colored female breast cases were new cases. It is not very likely that this disparity arises from any difference in the malignancy of white and colored female breast cancer. The more probable explanation is that the colored cases were diagnosed later in the course of the disease, thus resulting in less effective treatment.

The earlier papers in this series (*1–6*) employed the case-death ratio as a crude measure of incidence because the unreliability of intercensal population estimates made it inadvisable to compute prevalence rates in the usual manner. This is now unnecessary, and the case-death ratio, never a satisfactory measure of incidence, will be employed here simply as an index of cancer mortality.

TABLE 14.—*Number of reported cases, number of recorded deaths, and the ratio of cases to deaths from cancer, by sex, and color,*[1] *Birmingham, Ala., 1938*

	Total [2]			White			Colored		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Cases [3]	1,103	405	698	886	352	534	210	51	159
Deaths	318	116	202	221	89	132	97	27	70
Cases per death	3 5	3 5	3 5	4 0	4 0	4 0	2 2	1 9	2 3

[1] Resident cases and deaths only Includes 8 cases of unknown residence
[2] Includes cases and deaths of unknown color
[3] Includes deaths not reported as a case

There were 3 5 resident cases of cancer in Birmingham for every resident cancer death. This is considerably higher than the ratio of cases to deaths in Chicago (2.6 to 1) and in Pittsburgh (2.9 to 1), but is lower than in the other southern cities surveyed, New Orleans (3.9 to 1) and Atlanta (5.3 to 1).

To a large extent, the case-death ratio reflects the site distribution of cancer cases in a population. A great many cases of comparatively nonfatal cancer, such as skin cancer, in a given population, will produce a high case-death ratio, whereas a great many cases of cancer of the digestive tract, which is far more fatal, will produce a low case-death ratio. Since the white population of Birmingham had many cases of skin cancer, and the colored population very few, it is not surprising that the white case-death ratio should be so much higher than that of the colored (4.0 to 1 and 2.2 to 1, respectively). This low ratio for the colored cases, indicating high mortality, can also be accounted for in part by delayed treatment, which is probably more common among Negroes than whites.

Inasmuch as some types of cancer are more malignant than others, and some sites of cancer less susceptible to early diagnosis and treatment, it is to be expected that there would be considerable variation in the frequency with which cancers of different sites are found among living and dead cases. The site distributions of reported cases and recorded deaths, set forth in table 15, clearly bear out this expectation for all groups except the colored males. Reported cases and recorded deaths of cancer were so few for colored males in Birmingham that one cannot accept them as presenting a valid picture of cancer incidence for this group.

Cancers of the buccal cavity, breast, and skin were found in greater numbers among the white cases reported as alive than among those recorded as dead. Cancers of the digestive tract and respiratory system were far more frequent among the dead cases. The fatality of genito-urinary cancer differed considerably between the sexes. Cancer of this site was much more frequent among white male dead cases, and only slightly more frequent among white female dead cases than among the living.

TABLE 15.—*Percentage distribution by primary site, sex, and color of resident reported cases and recorded deaths of cancer, Birmingham, Ala., 1938*

Primary site	White				Colored			
	Cases		Deaths		Cases		Deaths	
	Male	Female	Male	Female	Male	Female	Male	Female
Buccal cavity, pharynx	15 4	3 5	5 6	2 3	5 9	0 6	3 7	--
Digestive tract	18 6	12 5	43 8	29 5	45 1	13 9	44 4	21 4
Respiratory system	3 7	1 3	11 2	3 8	3 9	1 3	3 7	2 9
Genito-urinary system	12 0	34 5	22 5	37 9	15 7	58 9	18 5	54 3
Breast	9	22 8	-	15 9	2 0	20 9	3 7	11 4
Skin	40 6	19 2	4 5	4 5	9.8	3 2	3 7	1.4
Brain	.3	2	--	8	--	--		--
Bones	6	7	--	--	-	.6	--	--
All others	8 0	5 2	12 4	5 3	17 6	6	22 2	8 6
All sites	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0

In table 15 the category "All others" contains all cases for which vague, ill-defined, or nonspecific primary sites were reported. It will be observed that this category is somewhat more prominent among white dead cases than living, and far more prominent among colored dead cases. The reason for this is that a great number of cases are diagnosed late in their history, when metastases and extensions have made it extremely difficult to determine the primary site of the malignancy. This occurs more commonly among colored cases than among white.

The difference in fatality of the various sites is also revealed by the duration of cases for each primary site. Duration, for live cases, refers to the period from the date of first diagnosis to the end of the

study year, and for dead cases from the date of first diagnosis to the date of death. Table 16 presents the duration of all cases by primary site and vital status.

TABLE 16.—*Percentage of cases of cancer which had been diagnosed for less than a specified number of months, classified by primary site and vital condition at the end of the year, Birmingham, Ala., 1938*

Duration since diagnosis of less than—	Buccal cavity		Digestive tract		Respiratory system		Genito-urinary system		Breast		Skin		All sites	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
6 months	40	39	41	72	63	77	45	52	26	42	33	13	37	57
12 months	63	62	68	86	75	100	69	74	45	52	57	50	60	76
18 months	74	62	76	93	75	100	77	85	56	65	65	75	69	86
24 months	78	69	82	95	75	100	82	89	66	83	71	81	75	91
30 months	83	77	86	97	75	100	84	94	72	85	77	88	80	94
36 months	84	85	89	98	75	100	86	95	78	88	80	94	83	95
42 months	92	100	91	99	75	100	89	97	82	90	83	94	86	97
48 months	92	100	91	100	75	100	90	97	85	90	86	94	88	97
54 months	95	100	92	100	88	100	91	98	88	94	89	94	91	98
60 months	96	100	92	100	88	100	93	99	89	96	90	94	92	99

Sixty-three percent of all cases which were alive at the end of the study year had had a duration of over 6 months, and 40 percent of them had had a duration of over a year. As contrasted to this, only 43 percent of the dead cases had lived 6 months after first diagnosis, and only 24 percent, a year. Even greater differences between the durations of living and dead cases would be found were it possible to include the living and apparently cured cases not reported in the study because they had received no treatment and were not observed in the study year.

Also, from table 16, it is seen that the duration of dead cases was much shorter than that of living cases within every site. Fifty-nine percent of the living cases with cancer of the digestive tract had had a duration of over 6 months, as against only 28 percent of the dead cases that had survived this period. This difference can be explained on the ground that a much larger proportion of the fatal than of the surviving cases had received late or inaccurate diagnosis and treatment.

It is, of course, true that the composition of the living and dead groups according to primary site of the cancer shows considerable difference. Cancer of the digestive tract, respiratory system, and genito-urinary system composed 69 percent of all cases dead at the end of the study year (table 17) and only 34 percent of the cases which survived this date. On the other hand, 61 percent of the surviving cases were cancers of the buccal cavity, breast, and skin, while only 20 percent of the fatal cases were primary in these sites.

TABLE 17.—*Percentage distribution according to site of resident cases of cancer, by vital status, Birmingham, Ala., 1938*

	Buccal cavity	Digestive tract	Respiratory system	Genito-urinary system	Breast	Skin	Brain	Bones	All others	Total
Cases alive at end of study year	8.7	8.4	0.8	24.9	15.7	36.2		1.0	4.3	100.0
Cases dead at end of study year	3.3	26.6	4.3	38.2	12.2	4.1	1.8	1.8	7.8	100.0

Cancer of certain sites, then, whether because of difficulty of diagnosis or relative lack of response to treatment, is fatal in a far greater proportion of cases than cancer of other sites. At the same time it is established that even in cases of the more fatal sites, early diagnosis will result in much longer duration and a far better chance of survival.

SUMMARY

The number of cancer cases reported under medical care in Jefferson County, Ala., during 1938 was 1,771, of which 1,103 were residents and 668 were nonresidents of the county. There were 354 death certificates listing cancer as a cause of death filed in the area, of which 318 were residents. The cancer case rate was found to be 242.9 per 100,000 residents, and the death rate 70.0 per 100,000. The ratio of cases to deaths was 3.5 to 1. The ratio of cases to deaths was almost twice as high for white as for colored cases, 4.0 to 1 and 2.2 to 1.

The skin was the most frequent primary site, followed by the buccal cavity, digestive tract, and genito-urinary system. Forty-six percent of the white male cases were skin cancer, a much higher proportion than in any other city yet reported in this series.

Four primary sites accounted for 90 percent of the white female cases: Genito-urinary system 32.4 percent, skin 24.9 percent, breast 21.6 percent, digestive tract 10.6 percent.

The distribution of colored female cases was similar to that of the white except that there was a much smaller proportion of skin cancer and a correspondingly greater percentage of genito-urinary cancer among the former group.

The cancer prevalence rate for Jefferson County (242.9 per 100,000) was the lowest rate reported for any of the cities studied. The incidence rate, based on cases first seen in the study year, was 139.4 per 100,000.

For all sites, the prevalence rates for the white population were much higher than for the colored. The most striking differences were found between the case rates of skin and buccal cavity cancer for the white and colored populations.

The most important sites among white males were skin (103.9 per 100,000), digestive tract (47.6 per 100,000), and buccal cavity (39.5 per 100,000). Cancer prevalence among white females was much higher than among white males. Among females, the highest rate was for genito-urinary cancer (131.5 per 100,000) and the next highest was for breast cancer (86.7 per 100,000). Skin cancer was the third most frequent (73.2 per 100,000).

The proportion of cases receiving medical care or observation which had been carried over into the study year from previous years differed between the sexes. Sixty-two percent of the total male cases originated during the study year, as against only 56 percent of the female cases.

Similar differences were observed among the various primary sites. In cancer of sites less susceptible to successful treatment, such as the respiratory system and digestive tract, the cases reported were largely new ones. Much larger proportions of skin and female breast cases were first seen prior to the study year.

Sixty-three percent of all cases alive at the end of the study year had been under medical care for over 6 months, while only 43 percent of the cases reported as dead at the end of the year had lived 6 months after first diagnosis. The duration of dead cases was much shorter than that of living cases within every site. Fifty-nine percent of the living cases of the digestive tract had a duration of over 6 months, while only 28 percent of the dead cases survived this period.

The composition of the living and dead groups according to primary site of the cancer showed considerable difference, reflecting the different fatality of the various sites. Cancer of the digestive tract, respiratory system, and genito-urinary system composed 69 percent of all cases dead at the end of the study year, and only 34 percent of the surviving cases. On the other hand, 61 percent of the surviving cases were cancers of the buccal cavity, breast, and skin, while only 20 percent of the total cases were primary in these sites.

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(*6*) McDowell, Arthur J.: The incidence of cancer in Dallas and Fort Worth, Tex., and surrounding counties, 1938. Pub. Health Rep., **57**: 125–139 (1942).

APPENDIX

TABLE 1.—*Number of all cancer cases, by sex and color, reported by various sources according to nature and number of reporting agencies, Birmingham, Ala., 1938*

Reported by—	Number of cases reported						
	Total	Total by sex		White		Colored	
		Male	Female	Male	Female	Male	Female
Hospital(s) only	502	191	311	154	212	37	99
Doctor(s) only	1,016	449	567	436	518	13	49
Both hospitals and doctors	207	65	142	61	118	4	24
Total	1,725	705	1,020	651	848	54	172
One source only	1,414	608	806	560	663	48	143
Two sources only	233	72	161	67	141	5	20
Three or more sources	78	25	53	24	44	1	9
Total	1,725	705	1,020	651	848	54	172

TABLE 2.—*Total number of reported cancer cases, by primary site, sex, and color, Birmingham, Ala., 1938*

Primary site	Total		White		Colored	
	Male	Female	Male	Female	Male	Female
Buccal cavity	106	36	104	34	2	2
Lip	69	16	68	16	1	------
Tongue	10	4	10	3	------	1
Mouth	2	2	2	1	------	1
Jaw	4	------	3	------	1	------
Pharynx	1	2	1	2	------	------
Others	20	12	20	12	------	------
Digestive tract	109	111	86	90	23	21
Esophagus	3	1	2	------	1	1
Stomach, duodenum	37	26	26	19	11	7
Intestines	24	37	22	34	2	3
Rectum, anus	23	26	17	22	6	4
Liver, biliary passage	16	12	13	8	3	4
Pancreas	5	7	5	5	------	2
Mesentery, peritoneum	1	2	1	2	------	------
Respiratory system	18	9	16	7	2	2
Larynx	5	2	5	2	------	------
Lungs, pleura	11	6	10	4	1	2
Others	2	1	1	1	1	------
Genito-urinary system	90	376	80	275	10	101
Uterus	------	321	------	224	------	97
Kidneys	8	8	6	8	2	------
Bladder	9	7	9	6	------	1
Prostate	62	------	56	------	6	------
Others	11	40	9	37	2	3
Breast	5	220	3	183	2	37
Skin	305	217	300	211	5	6
Brain	5	2	5	2	------	------
Bones (except jaw)	12	10	11	8	1	2
Others	55	39	46	38	9	1
All sites	705	1,020	651	848	54	172

TABLE 3.—*Number of resident cases of cancer reported,*[1] *by primary site, sex, and color, Birmingham, Ala., 1938*

Primary site	Total		White		Colored	
	Male	Female	Male	Female	Male	Female
Buccal cavity	57	20	54	19	3	1
Digestive tract	88	89	65	67	23	22
Respiratory system	15	9	13	7	2	2
Genito-urinary system	50	278	42	185	8	93
Breast	4	155	3	122	1	33
Skin	147	108	142	103	5	5
Brain	1	1	1	1		
Bones	2	5	2	4		1
All others	37	29	28	28	9	1
All sites	401	694	350	536	51	158

[1] Includes cases obtained from death certificates.

TABLE 4.—*Number of resident cancer cases first seen in 1938, by primary site, sex, and color, Birmingham, Ala., 1938*

Primary site	Total		White		Colored	
	Male	Female	Male	Female	Male	Female
Buccal cavity	32	12	31	11	1	1
Digestive tract	60	58	44	40	16	18
Respiratory system	13	5	11	3	2	2
Genito-urinary system	33	162	27	102	6	60
Breast	2	65	2	41		24
Skin	78	66	74	61	4	5
Brain	1	1	1	1		
Bones	2	2	2	1		1
All others	27	14	22	14	5	
All sites	248	385	214	274	34	111

TABLE 5.—*Number of resident deaths of cancer recorded, by primary site, sex, and color, Birmingham, Ala., 1938*

Primary site	Total		White		Colored	
	Male	Female	Male	Female	Male	Female
Buccal cavity	6	3	5	3	1	
Digestive tract	51	54	39	39	12	15
Respiratory system	11	7	10	5	1	2
Genito-urinary system	25	88	20	50	5	38
Breast	1	29		21	1	8
Skin	5	7	4	6	1	1
Brain		1		1		
Bones						
All others	17	13	11	7	6	6
All sites	116	202	89	132	27	70

TABLE 6.— *Number of reported cases of cancer of known vital status which had been diagnosed for less than a specified number of months, classified by primary site and vital condition at the end of the year, Birmingham, Ala., 1938*

Duration since diagnosis of less than	All sites[1]		Buccal cavity		Digestive tract		Respiratory system		Genito-urinary system		Breast		Skin	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
6 months	349	224	33	5	32	76	5	13	105	78	38	20	113	2
12 months	563	299	52	8	54	90	6	17	161	111	66	25	193	8
18 months	652	339	61	8	60	98	6	17	182	128	83	31	223	12
24 months	708	358	64	9	65	100	6	17	193	134	98	40	241	13
30 months	758	371	68	10	68	102	6	17	198	142	107	41	264	14
36 months	782	376	69	11	70	103	6	17	203	143	115	42	272	15
42 months	815	383	75	13	72	104	6	17	209	146	122	43	282	15
48 months	832	384	75	13	72	105	6	17	211	146	125	43	294	15
54 months	853	388	78	13	73	105	7	17	213	148	130	45	303	15
60 months	867	390	79	13	73	105	7	17	219	149	132	46	308	15
All cases	943	395	82	13	79	105	8	17	235	151	148	48	341	16

[1] Includes cases of brain, bones, and "all other" sites, as well as those sites presented above

DEATHS DURING WEEK ENDED FEBRUARY 28, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Feb 28, 1942	Corresponding week, 1941
Data from 88 large cities of the United States		
Total deaths	9,095	9,286
Average for 3 prior years	9,547	
Total deaths, first 8 weeks of year	74,171	78,396
Deaths per 1,000 population, first 8 weeks of year, annual rate	12.9	13.7
Deaths under 1 year of age	521	587
Average for 3 prior years	554	
Deaths under 1 year of age, first 8 weeks of year	4,489	4,355
Data from industrial insurance companies		
Policies in force	64,928,623	64,657,311
Number of death claims	11,930	14,562
Death claims per 1,000 policies in force, annual rate	9.6	11.7
Death claims per 1,000 policies, first 8 weeks of year, annual rate	10.1	11.3

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED MARCH 7, 1942

Summary

General health conditions in the United States continue favorable, as indicated by reports of communicable disease and urban mortality. Of the 9 important communicable diseases included in the following weekly table, the current incidence of measles, meningococcus meningitis, and poliomyelitis is slightly above the 5-year (1937–41) median, while the cumulative figures for the first 9 weeks of the current year are above the median for meningococcus meningitis, poliomyelitis, and whooping cough.

A total of 5,457 cases of influenza was reported for the current week, as compared with 5,984 for the preceding week and a 5-year median of 9,590 cases. The highest incidence is in Texas (1,734 cases), South Carolina (1,028), and Virginia (652). Only 4 other States reported more than 200 cases. The current and cumulative figures for meningococcus meningitis are slightly above the 5-year median, but the cases are scattered. Only 2 States (Massachusetts 11, California 6) reported more than 5 cases for the current week. Although only 23 cases of poliomyelitis were reported for the current week, this is above the figure for the corresponding week of each of the preceding 5 years, but the total to date is below that for the corresponding period in both 1940 and 1941.

Of 20 cases of smallpox, 6 occurred in Texas and 4 in Illinois, and of 76 cases of typhoid fever, 14 were reported in Georgia, 9 in Florida, and 7 in New York.

. Other reports for the week include 6 cases of anthrax (3 in Pennsylvania and 1 each in Massachusetts, New Jersey, and Louisiana), 13 cases of amebic dysentery, 106 cases of bacillary dysentery (70 in Texas, 17 in Georgia), 30 cases of unspecified dysentery (20 in Arizona, 9 in Virginia), and 35 cases of typhus fever (12 in Florida, 8 in Georgia).

The crude death rate for the current week for 88 large cities in the United States is 12.9 per 1,000 population as compared with 12.7 for the preceding week and with 13.1 for the 3-year (1939–41) average for the corresponding week.

Telegraphic morbidity reports from State health officers for the week ended March 7, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Mar. 7, 1942	Mar. 8, 1941		Mar. 7, 1942	Mar. 8, 1941		Mar. 7, 1942	Mar. 8, 1941		Mar. 7, 1942	Mar. 8, 1941	
NEW ENG.												
Maine	1	0	1	--	6	6	129	208	165	2	0	0
New Hampshire	0	0	0	20	8	------	6	81	33	0	0	0
Vermont	0	0	0		---	-----	4	17	17	0	0	0
Massachusetts	8	2	3			--	593	594	594	11	1	2
Rhode Island	3	0	0				169	0	14	0	0	0
Connecticut	1	1	1	1	26	21	375	52	238	4	1	1
MID. ATL.												
New York	30	26	26	[1] 17	[1] 59	[1] 56	678	6,415	1,224	5	2	6
New Jersey	6	6	10	11	123	29	322	2,071	1,437	5	1	1
Pennsylvania	11	14	35	-	-----	----	11	3,995	388	4	8	6
E. NO. CEN.												
Ohio	16	17	22	18	273	36	261	4,742	34	3	2	2
Indiana	9	12	12	35	52	86	50	450	23	0	1	1
Illinois	14	17	32	16	34	56	493	3,266	58	1	2	2
Michigan [2]	4	7	12	1	28	12	241	3,159	320	0	3	1
Wisconsin	1	0	4	52	175	175	647	873	873	0	0	1
W. NO. CEN.												
Minnesota	5	1	3	7	26	5	775	5	63	0	1	1
Iowa	2	3	4	1	247	28	325	183	183	0	0	0
Missouri	1	7	13	3	22	146	255	86	14	1	0	1
North Dakota	0	1	1	5	30	31	77	9	8	0	0	0
South Dakota	2	0	0		4	4	14	11	3	0	0	0
Nebraska	3	1	2	38	14	7	121	6	33	0	1	1
Kansas	2	3	11	8	20	29	319	564	382	1	3	1
SO. ATL.												
Delaware	0	1	1				7	431	26	0	0	0
Maryland [2]	5	2	5	29	57	57	584	104	104	2	2	2
Dist. of Col.	2	0	6	3	46	3	46	89	19	2	1	1
Virginia	13	9	16	652	1,016	1,016	128	1,537	252	3	3	3
West Virginia	5	10	10	52	125	271	[3] 229	338	38	0	1	2
North Carolina	12	20	19	52	135	116	1,356	649	649	3	1	2
South Carolina	4	5	7	1,028	958	958	192	194	33	3	1	1
Georgia	8	6	3	144	267	267	365	341	156	1	0	0
Florida	3	2	5	5	154	26	165	438	188	0	2	1
E. SO. CEN.												
Kentucky	8	9	9	4	80	83	71	657	121	1	1	3
Tennessee	2	9	8	187	275	261	79	364	117	1	0	1
Alabama	2	8	11	233	401	501	148	279	228	1	5	2
Mississippi [2]	6	1	4		--	--	-	--	-	0	3	0
W. SO. CEN.												
Arkansas	4	4	5	236	665	501	243	152	76	0	1	0
Louisiana	5	4	8	4	42	42	85	21	7	3	2	0
Oklahoma	4	5	6	176	253	334	293	5	34	1	3	0
Texas	37	29	40	1,734	1,167	1,167	2,222	767	594	4	0	4
MOUNTAIN												
Montana	0	0	0	25	19	19	10	1	49	0	0	0
Idaho	0	0	1		----	2	26	3	28	0	0	0
Wyoming	2	0	0	227	5	1	77	48	39	1	0	0
Colorado	7	15	8	73	61	30	207	213	98	0	0	0
New Mexico	3	0	1	8	51	51	111	220	60	0	0	0
Arizona	1	2	4	218	157	157	214	203	42	0	0	0
Utah [2]	0	1	1	5	8	8	93	35	130	0	0	0
Nevada	0	1	----	-----	172	------	16	0	------	0	0	----
PACIFIC												
Washington	0	4	4	3	18	4	150	96	96	1	0	0
Oregon	1	1	1	25	40	68	142	418	60	0	0	0
California	17	9	20	101	406	406	3,987	209	398	6	3	5
Total	270	275	456	5,457	7,725	9,590	17,111	34,599	15,922	70	55	55
9 weeks	2,909	2,649	4,939	44,521	440,532	124,134	[3] 114,639	174,249	102,124	573	437	481

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended March 7, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Mar. 7, 1942	Mar. 8, 1941		Mar. 7, 1942	Mar. 8, 1941		Mar. 7, 1942	Mar. 8, 1941		Mar. 7, 1942	Mar. 8, 1941	
NEW ENG.												
Maine	0	0	0	6	12	13	0	0	0	0	0	1
New Hampshire	0	0	0	8	7	7	0	0	0	0	0	0
Vermont	0	0	0	7	4	11	0	0	0	1	0	0
Massachusetts	0	0	0	272	124	224	0	0	0	0	2	1
Rhode Island	0	0	0	17	5	16	0	0	0	0	0	0
Connecticut	1	0	0	42	55	90	0	0	0	0	1	0
MID. ATL.												
New York	0	0	1	475	467	905	0	0	0	7	4	3
New Jersey	1	0	0	199	309	206	0	0	0	2	3	2
Pennsylvania	1	0	1	563	290	430	0	0	0	2	5	4
E. NO. CEN.												
Ohio	2	0	0	399	397	313	1	0	3	4	4	2
Indiana	0	0	1	166	161	204	0	2	4	1	2	2
Illinois	0	1	1	333	448	655	4	0	12	2	2	2
Michigan [2]	0	0	0	261	211	469	0	0	1	1	8	6
Wisconsin	0	0	0	176	137	170	0	2	5	0	2	1
W. NO. CEN.												
Minnesota	2	0	0	131	66	111	1	6	12	3	0	0
Iowa	0	1	0	48	65	126	0	5	18	0	1	0
Missouri	0	0	0	75	126	126	2	2	8	1	2	2
North Dakota	0	0	0	20	12	25	0	0	3	0	0	0
South Dakota	0	1	0	40	16	23	0	0	2	0	0	0
Nebraska	0	0	0	57	30	41	0	0	5	0	0	0
Kansas	0	1	0	102	53	154	0	6	6	0	1	0
SO. ATL.												
Delaware	0	0	0	63	10	10	0	0	0	0	0	0
Maryland [3]	0	0	0	91	51	51	0	0	0	1	1	1
Dist. of Col.	0	0	0	13	26	25	0	0	0	1	1	0
Virginia	1	1	1	31	31	40	0	0	0	0	3	3
West Virginia	0	1	1	35	47	47	0	0	0	0	2	3
North Carolina	2	0	0	35	62	58	0	0	0	0	0	1
South Carolina	0	0	0	3	13	5	0	0	0	0	9	1
Georgia	0	0	0	38	23	13	0	0	1	14	3	3
Florida	0	3	0	7	8	8	0	0	0	9	3	3
E. SO. CEN.												
Kentucky	1	1	0	100	185	69	0	0	0	2	12	5
Tennessee	1	0	0	73	155	53	2	0	0	3	8	0
Alabama	1	1	1	18	19	15	0	0	0	1	0	1
Mississippi [2]	0	0	0	10	9	7	1	0	0	0	2	-----
W. SO. CEN.												
Arkansas	1	1	0	6	13	9	1	2	4	1	1	1
Louisiana	2	0	0	6	4	6	0	0	0	5	3	6
Oklahoma	1	1	0	11	22	31	2	4	30	1	3	3
Texas	1	0	0	79	58	89	6	2	2	6	2	7
MOUNTAIN												
Montana	2	0	0	35	40	40	0	0	3	1	0	0
Idaho	0	0	1	3	8	16	0	0	3	0	0	0
Wyoming	0	0	0	19	9	9	0	0	0	0	0	1
Colorado	0	0	0	36	23	43	0	2	2	2	1	1
New Mexico	0	0	0	10	5	26	0	0	0	0	0	2
Arizona	0	0	0	16	4	6	0	0	0	0	2	0
Utah [2]	0	0	0	23	5	17	0	0	0	0	2	0
Nevada	0	0	-----	2	8	-----	0	1	-----	0	2	-----
PACIFIC												
Washington	0	1	0	66	20	41	0	8	8	0	1	1
Oregon	1	2	0	9	12	25	0	2	9	1	0	0
California	2	1	2	122	102	212	0	0	12	4	6	3
Total	23	17	17	4,357	3,967	5,398	20	44	293	76	104	100
9 weeks	232	239	195	34,622	31,699	18,148	215	419	2,657	721	658	985

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended March 7, 1942—Continued

Division and State	Whooping cough		Week ended March 7, 1942								
	Week ended—		Anthrax	Dysentery			Encephalitis	Leprosy	Rocky Mt spotted fever	Tularemia	Typhus fever
	Mar. 7, 1942	Mar. 8, 1941		Amebic	Bacillary	Unspecified					
NEW ENG.											
Maine	26	56	0	0	0	0	0	0	0	0	0
New Hampshire	15	3	0	0	0	0	0	0	0	0	0
Vermont	63	10	0	0	0	0	0	0	0	0	0
Massachusetts	183	269	1	2	0	0	1	0	0	0	0
Rhode Island	52	12	0	0	0	0	0	0	0	0	0
Connecticut	122	68	0	0	2	0	0	0	0	0	0
MID. ATL.											
New York [1]	536	361	0	4	6	0	6	0	0	0	0
New Jersey	286	72	1	0	0	0	0	0	0	0	0
Pennsylvania	227	320	3	0	0	0	1	0	0	4	0
E. NO. CEN.											
Ohio	170	358	0	0	0	0	0	0	0	0	0
Indiana	40	9	0	0	1	0	0	0	0	0	0
Illinois	170	98	0	0	3	0	1	0	0	0	0
Michigan [2]	130	274	0	0	0	0	0	0	0	0	0
Wisconsin	273	145	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	43	103	0	0	0	0	0	0	0	0	0
Iowa	18	61	0	0	0	0	0	0	0	0	0
Missouri	12	57	0	0	0	1	0	0	0	0	0
North Dakota	30	30	0	0	0	0	0	0	0	0	0
South Dakota	1	21	0	0	0	0	0	0	0	0	0
Nebraska	6	14	0	0	0	0	0	0	0	0	0
Kansas	58	171	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	0	9	0	0	0	0	0	0	0	0	0
Maryland [2]	54	59	0	0	0	0	0	0	0	0	0
Dist. of Col.	31	6	0	0	0	0	0	0	0	0	0
Virginia	51	143	0	0	0	9	0	0	0	2	0
West Virginia	[3] 60	55	0	0	0	0	0	0	0	0	0
North Carolina	77	272	0	0	0	0	0	0	0	0	0
South Carolina	94	124	0	0	0	0	0	0	0	0	1
Georgia	38	17	0	0	17	0	0	0	0	3	8
Florida	23	13	0	0	1	0	0	0	0	0	12
E. SO. CEN.											
Kentucky	98	42	0	1	0	0	0	0	0	0	0
Tennessee	26	89	0	0	0	0	0	0	0	1	1
Alabama	4	10	0	0	0	0	0	0	0	0	2
Mississippi [2]		---	0	0	0	0	0	0	0	1	0
W. SO. CEN.											
Arkansas	16	16	0	2	5	0	0	0	0	1	0
Louisiana	6	3	1	1	0	0	0	1	0	0	4
Oklahoma	9	26	0	0	0	0	0	0	0	0	0
Texas	167	256	0	3	70	0	1	0	0	1	7
MOUNTAIN											
Montana	6	40	0	0	0	0	0	0	0	0	0
Idaho	9	5	0	0	0	0	0	0	0	0	0
Wyoming	1	0	0	0	0	0	0	0	0	0	0
Colorado	61	45	0	0	0	0	0	0	0	0	0
New Mexico	19	24	0	0	0	0	0	0	0	0	0
Arizona	62	17	0	0	0	20	0	0	0	0	0
Utah [2]	23	84	0	0	0	0	0	0	0	0	0
Nevada	37	9	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	130	78	0	0	0	0	0	0	0	0	0
Oregon	35	10	0	0	0	0	0	0	0	0	0
California	309	400	0	0	1	0	1	0	0	0	0
Total	3,907	4,364	6	13	106	30	11	1	0	13	35
9 weeks	[3] 36,162	38,937									

[1] New York City only. [2] Period ended earlier than Saturday.

[3] Corrected reports from West Virginia: Week ended Feb. 14, 1942, whooping cough, 46; week ended Feb. 28, 1942, whooping cough, 25, measles, 352.

WEEKLY REPORTS FROM CITIES

City reports for week ended February 21, 1942

This table lists the reports from 88 cities of more than 10,000 population, distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	3	3	0	0	3	0	6	0	0	0
Baltimore, Md	0	0	2	2	278	3	22	0	25	0	0	31
Billings, Mont	0	0	------	0	0	0	0	0	0	0	0	0
Birmingham, Ala	2	0	31	1	10	0	10	0	2	0	0	3
Boise, Idaho	0	0	------	0	1	0	1	0	0	0	0	0
Boston, Mass	0	0	------	2	57	3	17	0	78	0	3	38
Bridgeport, Conn	0	0	------	1	14	0	2	0	4	0	0	1
Brunswick, Ga	0	0	------	0	18	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	------	0	10	0	8	0	29	0	0	12
Camden, N. J	0	0	1	1	8	0	2	0	12	0	0	1
Charleston, S. C	0	0	107	1	0	0	0	0	3	0	0	0
Chicago, Ill	11	0	5	2	87	0	29	0	110	0	0	48
Cincinnati, Ohio	0	0	1	1	1	1	7	1	36	0	0	25
Cleveland, Ohio	0	0	15	0	8	1	9	0	83	0	1	18
Columbus, Ohio	0	0	1	1	19	0	1	0	8	0	0	2
Concord, N. H	0	0	------	0	0	0	0	0	4	0	0	1
Cumberland, Md	0	0	1	0	7	0	1	0	3	0	0	0
Dallas, Tex	2	0	2	2	118	0	3	0	4	0	0	2
Denver, Colo	2	0	35	0	87	0	6	0	6	0	0	18
Detroit, Mich	7	0	1	1	104	0	17	1	153	0	0	51
Duluth, Minn	0	0	------	0	0	0	1	0	5	0	0	0
Fall River, Mass	0	0	------	0	1	0	0	0	36	0	0	0
Fargo, N. Dak	0	0	------	0	0	0	1	0	2	0	0	2
Flint, Mich	0	0	------	0	0	0	4	0	6	0	0	8
Fort Wayne, Ind	0	0	------	0	0	0	0	0	1	0	2	2
Frederick, Md	0	0	------	0	6	0	0	0	0	0	0	0
Galveston, Tex	0	0	------	0	1	0	3	0	1	0	0	0
Grand Rapids, Mich	0	0	------	0	16	0	3	0	4	0	0	13
Great Falls, Mont	0	0	------	0	119	0	0	0	0	0	0	11
Hartford, Conn	0	0	------	0	11	0	0	0	2	0	0	1
Helena, Mont	0	0	------	0	1	0	0	0	0	0	0	0
Houston, Tex	3	0	------	0	29	0	6	0	5	0	0	0
Indianapolis, Ind	1	0	------	2	7	0	1	0	28	0	0	26
Kansas City, Mo	0	0	------	1	10	1	10	0	24	0	0	5
Kenosha, Wis	0	0	------	0	2	0	0	0	3	0	0	8
Little Rock, Ark	0	0	26	0	122	1	3	0	0	0	0	0
Los Angeles, Calif	3	0	22	0	287	0	16	1	38	0	0	34
Lynchburg, Va	0	0	------	0	0	0	0	0	1	0	0	[illegible]
Memphis, Tenn	0	0	------	1	12	1	7	0	[illegible]	0	1	8
Milwaukee, Wis	0	0	1	1	23	0	16	0	44	0	0	100
Minneapolis, Minn	1	0	------	0	59	0	7	0	19	0	0	10
Missoula, Mont	0	0	------	0	0	0	3	0	0	0	0	0
Mobile, Ala	0	0	2	2	1	0	2	0	0	0	0	0
Nashville, Tenn	0	0	------	0	2	0	4	0	2	0	0	3
Newark, N. J	0	0	4	0	38	1	8	0	32	0	0	31
New Haven, Conn	0	0	------	0	122	0	0	0	5	0	0	5
New Orleans, La	1	0	------	0	8	1	2	1	2	0	1	2
New York, N. Y	27	3	17	3	33	6	81	2	228	0	1	218
Omaha, Nebr	0	0	------	0	19	0	3	0	4	0	0	1
Philadelphia, Pa	0	0	5	1	26	2	29	0	170	0	0	36
Pittsburgh, Pa	3	1	5	2	11	1	14	0	13	0	1	15
Portland, Maine	0	0	------	0	1	0	3	0	8	0	0	1
Providence, R. I	1	0	------	0	61	0	5	0	6	0	0	50
Pueblo, Colo	0	0	------	0	36	0	0	0	1	0	0	1
Racine, Wis	0	0	------	0	5	0	0	0	0	0	0	9
Raleigh, N. C	0	0	------	0	3	0	0	0	0	0	0	0
Reading, Pa	0	0	------	0	1	0	3	0	0	0	0	1
Richmond, Va	0	0	1	1	0	0	4	0	3	0	0	1
Roanoke, Va	0	0	------	0	2	0	2	0	1	0	0	0

See footnotes at end of table.

City reports for week ended February 21, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Rochester, N Y	0	0	-	0	10	0	2	0	5	0	0	3
Sacramento, Calif	0	0	1	0	173	0	2	0	1	0	0	8
St Joseph, Mo	0	0		0	1	0	7	0	2	0	0	0
St Louis, Mo	2	0	1	0	81	0	11	0	21	0	0	3
St Paul, Minn	0	0		1	429	0	2	0	6	0	0	15
Salt Lake City, Utah	0	0		0	10	0	2	0	2	0	0	3
San Antonio, Tex	0	0	9	1	5	0	10	0	4	0	0	1
San Francisco, Calif	0	0		0	53	1	6	0	10	0	0	1
Savannah, Ga	1	0	24	0	53	0	2	0	0	0	0	1
Seattle, Wash	0	0		2	1	0	7	0	2	0	0	24
Shreveport, La	0	0	--	0	7	0	4	0	0	0	0	0
South Bend, Ind	0	0		0	0	0	3	0	23	0	0	0
Spokane, Wash	0	0	-	0	2	0	5	0	7	0	0	13
Springfield Ill	0	0		0	47	0	2	0	3	0	0	0
Springfield, Mass	0	0	1	1	9	0	0	0	10	0	0	25
Superior Wis	0	0		0	1	0	0	0	3	0	0	4
Syracuse, N Y	0	0		0	5	0	0	0	8	0	0	45
Tacoma, Wash	0	0		0	0	0	2	0	2	0	0	0
Tampa Fla	0	0	1	1	11	0	5	0	0	0	1	1
Terre Haute, Ind	0	0		0	0	0	1	0	1	0	0	0
Topeka, Kans	0	0		0	4	0	2	0	1	0	0	4
Trenton, N J	0	0	1	1	3	0	5	0	1	0	0	7
Washington, D C	2	0	1	0	34	1	12	0	13	0	0	32
Wheeling, W Va	0	0		0	28	0	4	0	2	0	0	1
Wichita, Kans	0	0	2	0	11	0	4	0	1	0	0	6
Wilmington, Del	1	0	-	0	0	0	4	1	20	0	0	1
Wilmington, N C	0	0	--	0	283	0	1	0	0	0	0	0
Winston Salem, N C	1	0		0	168	0	1	0	2	0	0	2
Worcester, Mass	1	0		0	6	0	6	0	14	0	0	43

Dysentery amebic Cases San Francisco, 1
Dysentery bacillary—Cases Los Angeles, 3, Rochester, 2, Syracuse
Tularemia—Cases Milwaukee 1 St Louis 3
Typhus fever—Cases Mobile, 1, San Antonio, 3, Tampa, 2

Rates (annual basis) per 100,000 population for the group of 88 cities included in the preceding table (estimated population, 1942, 34,011,305)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Feb 21, 1942	11 04	50 44	5 98	511 60	75 28	219 39	0 00	1 69	168 64
Average for week 1937–41	19 19	215 87	22 28	862 08	129 83	252 70	4 95	2 01	171 46

TERRITORIES AND POSSESSIONS

HAWAII TERRITORY

Plague (rodent).—A rat found on January 23, 1942, and another rat found on January 24, both in Paauhau, Hamakua District, Island of Hawaii, T. H., have been found positive for plague.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended February 7, 1942.—During the week ended February 7, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		5		2	7	3	1	1	2	21
Chickenpox		5	1	190	335	81	50	31	150	843
Diphtheria		29	4	17	8	9			2	69
Dysentery				19						19
German measles		3		25	64	29	42	10	37	210
Influenza					7	44			22	73
Lethargic encephalitis							1			1
Measles		27	6	497	107	164	51	12	38	902
Mumps		14	2	468	390	127	443	121	373	1,938
Pneumonia	3	2			9			1	46	61
Scarlet fever		15	12	78	278	49	44	56	35	567
Trachoma					1					1
Tuberculosis			15	70	54		24	2		165
Typhoid and paratyphoid fever				20	2	1		2		25
Whooping cough	1	1	1	144	98	2	8	14	26	295
Other communicable diseases	2	1		6	279	39		2	1	330

CUBA

Provinces—Notifiable diseases—4 weeks ended January 3, 1942.—During the 4 weeks ended January 3, 1942, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana[1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1	1	2	7		18	29
Chickenpox		2		1		1	4
Diphtheria		28		1	2	2	33
Hookworm disease		24					24
Leprosy	1			2	1	2	6
Malaria	294	39	1	16	3	1,339	1,692
Measles		7					7
Poliomyelitis		2				2	4
Rabies		1					1
Scarlet fever		1					1
Tuberculosis	20	39	13	57	22	39	190
Typhoid fever	15	29	5	24	6	11	90
Undulant fever					1		1
Whooping cough						1	1

[1] Includes the city of Habana.

JAMAICA

Communicable diseases—4 weeks ended February 14, 1942.—During the 4 weeks ended February 14, 1942, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis	1		Leprosy		3
Chickenpox	6	17	Puerperal sepsis	1	3
Diphtheria		3	Tuberculosis	21	64
Dysentery	3	3	Typhoid fever	12	46
Erysipelas	1		Typhus fever	3	1

MALTA

Notifiable diseases—October 1941.—During the month of October 1941, certain notifiable diseases were reported in the island of Malta, including the island of Gozo, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cancer		22	Measles	4	
Chickenpox	3		Nephritis		22
Diabetes mellitus		13	Pneumonia		16
Diarrhea and enteritis (under 2 years of age)		99	Scarlet fever	2	
			Tetanus		1
Diphtheria	29	6	Trachoma	51	
Erysipelas	13		Tuberculosis (respiratory system)	26	12
Gastroenteritis		105	Typhoid fever	45	5
Influenza	8		Undulant fever	54	3
Leprosy		1	Whooping cough	49	2

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

Plague

Brazil—Bahia.—Fragmentary reports indicate the presence of plague in the interior of the State of Bahia, Brazil, during the latter part of 1941.

China.—The following report on plague in China during the winter of 1941 has been received from the American Embassy at Chungking:

For many years plague has been more or less a local problem in a few semi-isolated areas. Owing to the blockade of maritime traffic and to improvement of means of communications in the interior, in 1940 and 1941 the disease began to show a tendency to migrate toward the hinterland. From Fukien it has spread to Chekiang and Kiangsi; and more recently, in November 1941, an outbreak occurred in Hunan.

The report of the occurrence of plague in Changteh, Hunan, was

received on November 11. From that date to November 25, 6 cases were confirmed by bacteriological examination and animal inoculation test. Efforts were made immediately to control this outbreak by means of isolation, quarantine measures, preventive inoculations, disinfection and disinfestation, rat eradication, and house cleaning under the joint auspices of the National Health Administration, the Chinese Red Cross Medical Relief Corps, and the Army Medical Administration. No cases occurred from November 25 to December 13; but a new case was reported on December 14. In view of the possibility of the further spread of the disease inland, it was requested that the drug sulfathiazole be reserved for plague treatment as far as possible.

In Chekiang, plague broke out for the first time this winter in I-wu, about 200 kilometers northeast of Chuhsien. From October 2 to the end of November there were 113 cases, with 94 deaths. From December 1 to 6, 10 cases were reported. Control measures were initiated and are being carried on by the provincial health authorities.

Toward the end of November plague was found to be enzootic among rats in Kinhwa, an important town situated between I-wu and Chuhsien, and the Kinhwa Plague Control Committee was organized to take precautionary measures against the spread of the disease to Kinhwa.

Two additional plague cases occurred in Chuhsien, Chekiang, during November, where plague had occurred for the first time last winter. A special unit was detailed by the National Health Administration to that locality to take effective control measures. No new human or rat cases were found from December 1 to 8.

In Fukien, plague has been endemic since 1894. In 1940, plague occurred in 15 localities with a total of 257 cases. About the middle of December 1941, there was an outbreak of the disease in Lungchi and Loyuen.

Smallpox

France—Seine Department.—For the period February 1–10, 1942, 17 cases of smallpox were reported in Seine Department, France.

Typhus Fever

Denmark.—According to information received under date of February 25, 1942, typhus fever was reported in Denmark, believed to be caused by lice brought into the country by German soldiers The presence of lice was stated to be an alarming problem in two areas of Denmark with large German troop concentrations.

Morocco.—During the week ended February 14, 1942, 646 cases of typhus fever were reported in Morocco. During the preceding week 634 cases were reported.

Rumania.—For the week ended February 21, 1942, 237 cases of typhus fever were reported in Rumania.

Spain.—During the week ended January 31, 1942, 276 cases of typhus fever were reported in Spain (131 cases in Madrid and 27 in Barcelona). Recent information shows an outbreak of the disease in Bilbao, Vizcaya Province.

Union of Soviet Socialist Republics.—Under date of February 28, 1942, an epidemic of typhus fever was reported among Polish troops and civilians in the southeastern part of the Union of Soviet Socialist Republics, causing approximately 30 deaths a day among the native population of Bokhara.

Yellow Fever

Colombia.—Yellow fever has been reported in Colombia as follows: Boyaca Department, February 1, 1 death, February 4, 1 death; Intendencia of Meta, January 23, 1 death; Santander Department, January 29, 1 death.

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U.S. PUBLIC HEALTH SERVICE 1798

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Public Health Reports

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A SUMMARY OF CENSUS DATA ON SEWERAGE SYSTEMS IN THE UNITED STATES[1]

Beginning in February 1939, the United States Public Health Service has conducted, from its Cincinnati Station of Stream Pollution Investigations, a Nation-wide census of sewerage systems and water purification plants in the continental United States. The sewerage census, which has been brought to date as of the year 1940, has included detailed information on the rated capacity and methods of treatment of each individual plant and also on the population served, date of installation, and volume of water or sewage treated. The sewerage data have shown, in addition to treatment, the populations contributing untreated sewage discharged by individual communities in each State, and the bodies of water into which both treated and untreated sewage is discharged.

The tabulations of census data from individual communities have been made up by States in mimeographed form for general distribution. The summary of census data shows for each State the total number of sewered communities, the number of treatment plants of various types, and the numbers of communities and their populations served under each classified group according to method or lack of treatment. Similar information also is given on classified methods of processing and disposal of sewage sludge.

For convenience, the summaries have been divided into four tables. In table 1 are given the totals, by States, for sewer systems and disposal of raw sewage. In table 2 are shown the general data on sewage treatment, together with data on treatment by sedimentation only or by less than sedimentation, which usually are termed primary treatment. In table 3 are given corresponding data for various types of secondary treatment, such as trickling filters, activated sludge, chemical precipitation, etc. In table 4 are given the numbers of plants at which chlorination is used in connection with either primary or secondary treatment, and also the plants at which various methods of sludge processing and disposal are followed. The data on chlorination have been tabulated separately, as this process is used in connection with all types of treatment and cannot be regarded as belonging to any particular type, either primary or secondary.

[1] From the Division of Public Health Methods, National Institute of Health.

TABLE 1.—*Sewer systems and raw sewage disposal*

State	Number of sewered communities				Ownership of system		Total population of sewered communities		Disposal of raw sewage							
	Total	Type of system							Total communities discharging				To ocean, bays, etc.		To streams, etc.	
		Separate	Combined	Both	Public	Private	Census	Estimated connected	All raw	Part raw	Total population: Census	Total population: Estimated connected	Number of communities	Estimated population connected	Number of communities	Estimated population connected
Alabama	144	144	0	0	122	33	826,000	675,000	66	13	427,000	321,000	2	42,600	77	278,900
Arizona	41	41	0	0	29	11	195,000	175,000	5	1	31,000	22,000	0		6	22,000
Arkansas	111	109	2	0	104	7	464,000	398,000	26	3	221,000	195,000	0		29	195,000
California	346	340	5	1	321	29	4,535,000	4,074,000	81	7	1,622,000	1,382,000	61	1,214,300	27	167,800
Colorado	106	99		4		3	598,000	450,000	55	0	99,000	75,000	0		55	75,000
Connecticut	62	38	14	10	51	12	1,381,000	1,135,000	19	7	710,000	297,000	6	110,900	20	186,300
Delaware	19	14	4	1	19	0	142,000	135,000	8	1	121,000	114,000	5	6,900	4	106,600
District of Columbia	1	0	1	0	1	0	487,000	550,000	0	0			0		0	
Florida	113	113	0	0	109	4	821,000	746,000	27	9	462,000	369,000	15	184,200	21	184,800
Georgia	167	163	0	4	161	9	1,041,000	818,000	72	6	755,000	338,000	2	68,000	76	270,100
Idaho	15	14	0	0	15	0	108,000	116,000	11	0	91,000	101,000	0		11	101,000
Illinois	380	206	169	4	380	0	5,887,000	5,539,000	87	12	603,000	420,000	0		93	420,000
Indiana	269	71	193	5	259	12	1,991,000	1,723,000	188	8	791,000	587,000	0		196	587,000
Iowa	351	319	14	4	271		1,257,000	1,095,000	73	2	405,000	331,000	0		75	331,000
Kansas	210	208	1	1	205		896,000	759,000	52	0	283,000	239,000	0		52	239,000
Kentucky	154	121	26	7	119	35	927,000	836,000	89	6	703,000	631,000	0		95	631,000
Louisiana	76	76	0	0	71	5	894,000	886,000	28	1	706,000	747,000	0		29	747,000
Maine	105	32	51	13	103	3	538,000	380,000	96	5	509,000	371,000	37	160,900	64	210,500
Maryland	86	74	12	0	84	2	1,356,000	1,168,000	33	1	157,000	100,000	1	600	33	98,900
Massachusetts	127	88	30	9	126	1	3,777,000	3,514,000	81	1	2,854,000	2,698,000	44	2,136,000	38	562,000
Michigan	307	115	149	30	294	12	3,523,000	3,513,000	173	0	646,000	550,000	0		173	550,000
Minnesota	306	253	49	1	304	0	1,464,000	1,457,000	106	1	185,000	157,000	0		107	157,000
Mississippi	110	110	0	0	109	1	397,000	336,000	55	0	308,000	260,000	0		55	260,000
Missouri	192	169	5	18	192	0	2,040,000	1,730,000	64	2	1,618,000	1,434,000	0		66	1,434,000
Montana	70	55	3	0	68	2	231,000	205,000	23	2	169,000	146,000	0		25	146,000
Nebraska	195	164	12	7	179	7	650,000	594,000	90	1	414,000	317,000	0		91	317,000
Nevada	25	18	7	0	21	4	59,000	58,000	10	0	16,000	14,000	0		10	14,000
New Hampshire	60	33	9	0	59	1	253,000	250,000	50	1	315,000	225,000	0		51	225,000
New Jersey	236	210	12	3	193	17	3,512,000	3,455,000	19	3	938,000	873,000	12	691,000	10	182,000
New Mexico	46	46	0	0	36	67	137,000	159,000	4	0	13,000	10,000	0		4	10,000
New York	399	311	38	31	362	37	10,837,000	10,712,000	95	8	7,874,000	5,372,000	1	4,600,000	102	772,000
North Carolina	276	265	1	1	254	22	1,016,000	925,000	103	9	392,000	340,000	11	37,000	104	[illegible]

North Dakota	82	32	50	0	81	1	179 000	160 000	12	0	33,000	27 000	0		12	27 000
Ohio	513	301	161	51	510	4	4 921 000	4 695 000	254	3	2,588,000	1 701 000	0	------	257	1,701 000
Oklahoma	210	210	0	0	210	0	1 009 000	1 005 000	26	0	160 000	159 000	0		28	159 000
Oregon	92	48	36	8	88	5	552 000	418 000	47	2	446 000	335 000	7	17,000	42	318 000
Pennsylvania	629	376	162	74	525	105	6 792 000	6 478,000	428	8	5 275 000	4,770 000	0		436	4,770 000
Rhode Island	13	7	3	3	13	0	518 000	460 000	2	2	132,000	89 000	2	26 000	2	62,600
South Carolina	97	97	0	0	96	1	453 000	504 000	25	4	203 000	198 000	3	59 000	26	139,400
South Dakota	104	82	22	0	104	0	217 000	221 000	30	1	47 000	41 000	0		31	41 000
Tennessee	109	101	5	3	100	5	976 000	827 000	48	10	841 000	694 000	0		58	694 000
Texas	447	438	7	1	391	55	2 773 000	2 633 000	14	1	452,000	361 000	5	105 000	10	256 000
Utah	47	35	0	0	37	10	296 000	213 000	24	1	251 000	186,000	0		25	186 000
Vermont	68	6	32	0	55	7	197 000	160 000	64	0	182 000	152,000	0		64	152,000
Virginia	139	61	3	0	47	15	923 000	835 000	80	1	726 000	665 000	8	201 000	73	454,000
Washington	137	74	5	8	122	15	988 000	767 000	72	3	866 000	640,000	27	462,000	48	178 000
West Virginia	387	312	52	22	157	247	806 000	687 000	336	14	742 000	616 000	0	- -	350	616 000
Wisconsin	301	208	50	43	282	2	1 781 000	1,762,000	55	4	184 000	156,000	0	------	59	156 000
Wyoming	38	37	0	0	37	0	104 000	114,000	22	2	65 000	73 000	0	----	24	73 000
Total	8 518	6 444	1 445	367	7 476	747	75 728 000	70 506 000	3 431	166	37 487 000	29 889 000	249	10 122,400	3 348	19 766,900

TABLE 2.—*Sewage treatment, general and primary*

State	Sewage treatment, all types						Less than sedimentation		Plants with sedimentation only							
	Communities served			Treatment plants					Total		Septic tanks		Imhoff tanks		Separate tanks	
	Total number	All treated	Part treated	Total number	Population served: Census	Population served: Estimated connected	Number of plants	Estimated population connected	Number	Estimated population connected	Number	Estimated population connected	Number	Estimated population connected	Number	Estimated population connected
Alabama	78	65	13	117	523,000	354,000	2	120,900	99	220,500	75	79,680	14	15,030	10	125,770
Arizona	36	35	1	36	170,000	153,000	0		21	43,500	14	29,400	5	11,500	2	2,690
Arkansas	85	82	3	103	260,000	203,000	0		78	119,000	30	36,780	27	60,600	21	21,620
California	265	258	7	243	3,711,000	2,692,000	7	1,350,900	82	540,000	49	131,520	17	45,500	16	384,050
Colorado	51	51	0	49	499,000	375,000	0		26	32,000	13	11,000	8	8,000	5	13,000
Connecticut	43	36	7	52	1,146,000	838,000	4	96,000	31	589,000	10	12,310	4	61,350	17	515,300
Delaware	11	9	1	10	128,000	21,000	0		6	12,200	1	800	3	4,060	2	7,300
District of Columbia	1	1	0	1	487,000	550,000	0		1	550,000	0		0		1	550,000
Florida	86	77	9	177	498,000	377,000	3	48,100	163	269,700	136	150,690	22	80,180	5	38,460
Georgia	95	90	6	143	611,000	480,000	0	--	113	95,600	74	46,020	35	26,140	4	23,400
Idaho	4	4	0	4	17,000	15,000	0		0		0		0		0	
Illinois	293	281	12	264	5,373,000	5,119,000	0		78	1,810,800	19	25,460	41	1,628,970	19	171,400
Indiana	81	73	8	93	1,241,000	1,136,000	1	97,000	31	39,100	20	21,880	9	10,150	2	7,050
Iowa	278	276	2	302	854,000	764,000	0		39	84,000	29	17,700	9	3,400	1	62,500
Kansas	158	158	0	164	612,000	520,000	0	----	29	171,200	13	32,630	14	15,670	2	122,850
Kentucky	64	59	6	97	270,000	205,000	0		64	81,700	43	27,400	20	50,020	1	4,200
Louisiana	48	47	1	52	192,000	139,000	1	1,750	13	15,900	9	11,900	4	4,000	0	
Maine	9	4	5	9	32,000	9,000	0		8	8,500	7	2,500	1	6,000	0	
Maryland	53	52	1	53	1,216,000	*1,068,000	3	16,500	36	124,700	5	2,000	24	30,300	7	92,400
Massachusetts	46	45	1	49	935,000	816,000	2	88,000	8	207,000	0		0		8	207,000
Michigan	134	134	0	115	2,877,000	2,963,000	1	1,400	66	2,333,000	18	24,000	13	186,000	35	2,123,000
Minnesota	200	199	1	192	1,280,000	1,300,000	0	--------	106	132,000	7	7,600	89	78,000	10	46,000
Mississippi	55	55	0	60	88,000	76,000	0	-------	55	53,000	48	42,800	7	10,200	0	
Missouri	128	126	2	153	442,000	296,000	0	-------	74	105,000	31	54,900	37	33,100	6	17,400
Montana	*47	45	2	49	70,000	59,000	0	---------	35	38,000	27	34,000	4	3,800	0	
Nebraska	105	104	1	105	450,000	277,000	0	-----------	29	37,000	14	28,500	14	7,900	1	600
Nevada	15	15	0	14	43,000	44,000	0	-----------	12	36,400	6	4,500	1	1,700	5	30,200
New Hampshire	10	9	1	15	51,000	25,000	0	--	10	21,600	7	1,200	2	16,400	1	4,000
New Jersey	217	214	3	199	2,816,000	2,582,000	4	4,000	108	2,022,000	54	144,000	29	292,000	25	1,586,000
New Mexico	42	42	0	42	125,000	149,000	0		27	61,500	14	7,150	12	40,350	1	14,000
New York	*303	295	8	285	10,145,000	5,340,000	15	1,394,000	174	1,986,000	35	78,700	74	683,000	67	1,224,000
North Carolina	*170	161	9	240	664,000	‡585,000	2	5,650	162	146,000	56	27,000	90	76,000	16	43,000

North Dakota	70	70	0	70	147,000	133,000	0	----------	34	25,900	17	16,150	17	9,800	0	----------
Ohio	259	256	3	217	3,286,000	2,994,000	0	----------	71	719,800	11	3,800	50	327,000	10	339,000
Oklahoma	184	184	0	200	849,000	847,000	0	----------	84	149,900	32	44,800	51	95,600	1	9,500
Oregon	45	43	2	55	110,000	83,000	0	----------	35	44,000	27	13,000	1	7,000	7	24,000
Pennsylvania	201	*193	8	188	3,500,000	1,708,000	2	61,400	81	950,000	14	6,700	47	564,000	20	380,000
Rhode Island	11	9	2	10	489,000	371,000	0	----------	5	39,900	3	20,400	1	10,000	1	9,500
South Carolina	72	68	4	136	260,000	306,000	0	----------	98	127,300	69	50,065	36	29,255	3	48,000
South Dakota	74	73	1	74	176,000	180,000	0	----------	35	34,700	3	630	31	27,410	1	3,260
Tennessee	61	51	10	81	288,000	133,000	0	----------	67	84,200	40	270	26	26,140	1	5,800
Texas	433	432	1	453	2,581,000	2,272,000	0	----------	192	312,000	62	64,000	125	217,000	5	31,100
Utah	23	22	1	23	47,000	27,000	0	----------	16	15,600	14	13,100	2	2,500	0	----------
Vermont	4	4	0	4	15,000	8,000	0	----------	2	200	2	190	0	----------	0	----------
Virginia	59	58	1	66	199,000	180,000	0	----------	38	61,000	18	14,500	16	33,500	4	13,000
Washington	65	62	3	68	501,000	127,000	2	2,700	51	88,400	37	32,680	7	9,050	7	46,625
West Virginia	51	37	14	213	97,000	71,000	0	----------	185	39,600	171	10,640	14	28,990	0	----------
Wisconsin	246	242	4	215	1,607,000	1,606,000	0	----------	98	390,100	17	6,375	25	20,750	56	363,000
Wyoming	16	14	2	17	41,000	41,000	0	----------	13	29,200	8	16,210	5	12,950	0	----------
Total	5,085	4,918	166	5,580	52,019,000	40,613,000	49	3,288,300	2,889	15,097,600	1,409	1,462,830	1,083	4,910,325	405	8,760,785

See footnotes at end of table 4.

TABLE 3.—*Intermediate and secondary treatment*

State	Total plants		Chemical treatment		Activated sludge		Trickling filter		Intermittent sand filter		Application to land		Miscellaneous	
	Number	Estimated population connected	Number	Estimated population connected	Number	Estimated population connected	Number	Estimated population connected	Number	Estimated population connected	Number	Estimated population connected	Number	Estimated population connected
Alabama	16	12 700	1	2 000	0		5	6 960	2	1 750	8	2 020	0	
Arizona	15	109 500	3	44 100	2	40 500	3	8 300	0		9	57 000	*1	500
Arkansas	25	*84 400	4	13 100	1	25 000	11	*39 570	4	3 960	0		**5	12 [illegible]00
California	154	801 100	†5	29 [illegible]	10	184 270	55	158 910	5	5 [illegible]00	102	373 160	**12	205 050
Colorado	23	343 000	6	307 000	0		10	29 000	2	1 100	3	1 800	*3	227,000
Connecticut	17	152 900	1	65 000	3	68 900	2	21 000	13	84 720	1	200	0	
Delaware	4	9 200	0		0		4	9 200	0		0		0	
District of Columbia	0		0		0		0		0		0		0	
Florida	11	59 200	2	12 000	0		6	41 000	3	6 200	0		0	
Georgia	30	384 500	3	286 650	0		27	178 960	2	1,400	0		*1	75 000
Idaho	4	15 500	2	11 000	0		2	11 000	0		2	4 500	0	
Illinois	186	3,307 700	4	75 500	52	2 638 500	114	514 780	16	20 300	0		**3	82 600
Indiana	61	999 600	2	6 700	13	761 100	44	180 010	2	6 040	0		*3	52 500
Iowa	263	680 000	12	221 000	5	26 000	134	5[illegible]3 000	116	105 000	0		*5	2 000
Kansas	135	318 700	0		13	105 700	67	188 670	44	41 570	2	1 850	*17	21 [illegible]20
Kentucky	33	123 600	3	22 060	2	3 050	30	116 740	0		0		0	
Louisiana	38	121 000	0		4	44 200	25	59 500	3	5 700	0		*5	11 700
Maine	1	16	0		0		0		0		1	16	0	
Maryland	14	892 300	2	2 940	2	849 300	12	862 310	3	18 230	0		0	
Massachusetts	39	521 000	0		1	20 000	10	382 000	29	175 090	1	2 000	0	
Michigan	48	629 000	**7	74 700	16	315 000	17	261 000	11	43 000	2	13 900	*4	73 000
Minnesota	86	1,168 000	5	956 000	9	36 400	75	220 000	1	1,070	0		*2	805,000
Mississippi	5	22 600	0		0		4	21 500	0		0		*1	1 100
Missouri	82	191 000	2	775	13	40 500	65	147 000	1	2 100	1	180	0	
Montana	15	21 000	1	6 000	0		0		6	4 800	8	10 000	0	
Nebraska	76	240 000	8	87 200	23	93 900	36	130 000	10	4 900	4	4,300	0	
Nevada	2	8 000	1	2 000	0		0		0		1	6 000	0	
New Hampshire	5	3 600	0		0		3	2 500	3	1 900	1	100	0	
New Jersey	87	556 000	19	213 000	8	79 000	44	256 000	26	116 000	5	[illegible] 500	*12	182 000
New Mexico	15	87 250	3	60 000	0		10	74 150	0		3	23,100	0	
New York	94	1 960 000	7	261 000	8	1,378 000	56	271 000	23	91 000	8	1 400	**9	122,000
North Carolina	69	409 000	9	‡172 000	8	181 000	26	127 000	31	23 000	1	250	**1	1,500
North Dakota	37	107 100	2	17 000	1	5 000	11	70 400	1	600	22	13,680	*1	400
Ohio	146	2,274 000	**20	158 000	27	1 241 000	68	961 000	41	96 600	0		†12	224,000
Oklahoma	116	697 500	18	273 550	4	33 080	103	463 320	1	1,260	1	860	*4	10 180
Oregon	20	39 000	1	8 000	3	12,500	10	25 000	3	550	1	200	*3	1,400
Pennsylvania	104	696 000	2	30 500	18	177 000	71	422 000	3	8 100	3	41,800	*10	22,400
Rhode Island	5	331,000	0		3	317,000	1	12,000	1	2,000	0		0	

South Carolina	38	178,200	0	----------	3	7,700	14	140,700	4	6,850	7	2,265	**10	20,700
South Dakota	39	145,400	1	33,640	2	46,180	31	126,600	6	5,030	1	990	0	----------
Tennessee	14	48,900	2	7,300	1	1,300	11	36,600	1	8,500	0	----------	*1	5,500
Texas	258	1,959,000	5	290,000	17	812,000	163	979,000	2	1,760	74	269,000	*15	34,700
Utah	7	10,900	0	----------	0	----------	0	----------	2	1,300	5	9,600	0	----------
Vermont	2	8,300	0	----------	0	----------	0	----------	0	----------	0	----------	*2	8,300
Virginia	26	92,000	3	54,000	1	1,600	21	38,000	0	----------	2	700	*1	2,000
Washington	15	35,500	2	6,200	2	1,600	6	22,125	1	300	1	250	4	7,050
West Virginia	28	31,200	0	----------	0	----------	5	29,300	0	----------	23	1,870	0	----------
Wisconsin	117	1,215,800	*15	192,700	27	873,200	73	226,600	9	7,900	1	500	**4	5,550
Wyoming	4	12,250	2	11,100	0	----------	1	1,000	1	150	0	----------	0	----------
Total	2,630	22,143,416	185	4,012,775	302	10,479,780	1,486	8,424,705	432	904,700	304	851,991	151	2,217,730

See footnotes at end of table 4.

445700°

TABLE 4.—*Chlorination—sludge processing and disposal*

State	Number of plants providing:—												
	Plants with chlorination		Raw sludge disposal	Sludge digestion					Sludge dewatering and disposal			
	Number	Estimated population connected		Total	Septic tanks	Imhoff tanks	Separate digestion tanks	Digestion in lagoons	Beds and lagoons	Mechanical dewatering	Incineration	No organized method
Alabama	10	18,550	0	115	84	16	15	0	29	0	0	86
Arizona	4	46,850	0	35	19	7	8	1	11	0	0	23
Arkansas	6	8,360	0	103	33	39	31	0	68	0	0	35
California	46	486,500	2	235	85	86	64	0	134	2	*0	‡94
Colorado	3	225,000	0	48	16	16	16	0	46	1	1	2
Connecticut	22	335,900	5	42	17	8	20	0	34	8	5	7
Delaware	9	16,700	0	10	1	6	4	0	9	0	0	1
District of Columbia	0		0	1	0	0	1	0	0	1	0	0
Florida	15	126,900	1	173	139	24	10	0	21	0	0	*152
Georgia	10	341,550	1	142	77	45	20	0	69	1	0	73
Idaho	1	6,000	0	4	0	2	2	0	2	0	0	2
Illinois	38	271,900	*4	258	21	132	112	0	228	6	†3	27
Indiana	9	268,550	0	92	22	37	32	1	64	4	4	24
Iowa	4	23,600	0	302	113	136	53	0	267	4	0	32
Kansas	1	7,250	0	161	18	117	34	0	155	0	0	9
Kentucky	27	128,400	0	97	43	40	14	0	55	0	0	42
Louisiana	16	69 700	0	51	13	34	4	0	24	0	0	28
Maine	0		0	9	8	1	0	0	1	0	0	8
Maryland	26	137,100	2	48	5	29	15	0	28	7	1	17
Massachusetts	5	184,000	20	18	2	9	7	0	31	1	0	7
Michigan	53	2 186 000	10	103	28	19	56	0	77	†8	4	21
Minnesota	66	1,118,000	3	189	7	123	58	2	184	2	2	6
Mississippi	12	29,000	*0	60	48	11	1	0	9	0	0	51
Missouri	13	30,800	0	156	32	94	30	0	121	0	0	35
Montana	1	300	0	47	40	4	1	0	5	0	0	44
Nebraska	2	3,100	1	104	23	47	35	0	82	0	0	23
Nevada	0		0	14	6	1	7	0	0	0	0	14
New Hampshire	4	5,200	0	15	9	5	1	0	7	0	0	8
New Jersey	133	1,155 000	9	185	69	60	59	0	128	9	3	53
New Mexico	1	500	0	42	16	19	7	0	24	0	0	18
New York	161	2,779,000	11	257	54	110	96	1	221	12	5	†34
North Carolina	13	51,000	†4	225	71	123	30	0	154	6	0	71
North Dakota	0		0	66	28	30	8	0	32	0	0	34
Ohio	49	1,853,000	4	*217	31	109	79	0	186	11	8	19
Oklahoma	20	241,300	2	198	36	136	26	0	161	1	0	39

Oregon	11	31 000	0	55	32	5	18	0	22	0	0	33
Pennsylvania	107	939 000	1	184	28	98	58	0	153	2	1	30
Rhode Island	4	43, 900	1	9	4	2	3	0	6	1	0	3
South Carolina	3	72, 500	0	136	91	36	8	1	61	0	0	75
South Dakota	0	-----	1	73	5	60	9	0	46	0	0	28
Tennessee	5	11, 000	0	81	42	35	5	0	34	0	0	47
Texas	84	237, 000	3	445	94	315	43	2	265	1	1	182
Utah	0	----	0	23	19	4	0	0	0	0	0	23
Vermont	2	8, 300	0	4	2	0	2	0	2	0	0	2
Virginia	36	116, 000	0	64	21	32	12	0	45	0	0	19
Washington	29	97, 980	0	96	43	8	15	0	1	0	0	65
West Virginia	13	50 700	0	212	194	19	0	0	16	0	0	196
Wisconsin	50	561, 300	6	209	21	36	153	0	196	8	†2	14
Wyoming	3	12, 700	0	17	9	6	2	0	8	0	0	9
Total	1, 127	14, 336, 390	91	5, 403	1, 819	2, 331	1, 284	8	3, 522	96	40	1, 865

Arizona
  *Rapid sand filters.
Arkansas
  *Includes 6,900 served by Texarkana, Tex , plant.
  **Contact beds.
California.
  *Excludes cake dried for fertilization.
  **Nine oxidizing lagoons
  One contact bed
  One pressure sand filter
  †One, mechanical flocculation.
  ‡Does not include 5 to ocean outfalls.
Colorado.
  *Two oxidizing lagoons.
  One magnetite filter.
Florida:
  *One to canal.
Georgia
  *One magnetite filter.
Illinois.
  *Includes 1 plant pumping to another.
  **One magnetite filter.
  One rapid sand filter.
  One oxidizing lagoon.
  †Does not include one destructive distillation.
Indiana:
  *One Guggenheim process.
  One contact bed.
  One magnetite filter.
Iowa:
  *Contact beds.

Kansas
  *Eight contact beds
  Nine oxidizing lagoons.
Louisiana
  *Five contact beds
Maryland
  *Population connected to treatment includes 35,000 to Washington, D. C., plant.
Michigan
  *Three contact beds, one mechanical filter
  **Includes one plant flocculation only
  †Does not include 7 plants having sludge transferred to another plant for mechanical dewatering.
Minnesota·
  *Two magnetite filters.
Mississippi
  *One contact bed.
Montana
  *One treatment unknown.
New Jersey
  *Five magnetite filters.
  Four mechanically cleaned sand filters.
  One rapid sand filter.
  Two contact beds.
New York:
  *Two, treatment unknown.
  **Four magnetite filters.
  Two vacuum filters.
  One mechanically cleaned sand filter.
  Two contact beds.
  †Excludes 2 to sea.

North Carolina:

*Seven, treatment unknown
**One rapid sand filter
†Includes one plant digesting raw sludge aerobically.
‡23,800, treatment unknown

North Dakota:

*One contact bed

Ohio.

*One plant pumps to another
**One Guggenheim process.
†Four magnetite filters
Seven contact beds.
One grass filter.

Oklahoma:

*Four contact beds.

Oregon:

*Three contact beds.

Pennsylvania:

*One, treatment unknown.
**Eight contact beds.
One plain aeration.
One grass filter.

South Carolina:

*Ten contact beds.

Tennessee

*One contact bed.

Texas

*Eleven contact beds.
Two oxidizing lagoons.
One contact aeration.
One plain aeration

Vermont

*Two plain aeration.

Virginia

*One contact bed.

Washington

*Four contact beds.

West Virginia

*Includes 3,500 people in Virginia.

Wisconsin

*Four dose no chemicals (floc only).
**Three plain aeration
One rapid sand filter.
†Does not include one rotary sludge dryer

It will be noted in table 1 that the numbers of sewer systems classified as "separate" or "combined" or both, and as publicly or privately owned, do not in all cases add up to the total number of communities in each State served by sewers since in some instances the status of particular systems in these two respects was unknown and hence could not be classified. In grouping systems as to ownership, some of them were found to be partly public and partly private and thus had to be counted under both groups

It is apparent in table 3 that the sum of the number of classified unit processes and their connected population figures in most cases exceeds the number of treatment plants and total population connected. This discrepancy results from the inclusion of the individual unit treatment processes at plants embracing more than one of these major unit processes. The same considerations apply to sludge digestion in table 4 because of installations including both Imhoff tanks and separate sludge digestion at the one plant.

In tables 1 and 2, the total census and estimated connected populations of communities served by sewer systems, of those discharging raw sewage, and of those served by treatment of all kinds, have been rounded to thousands. This has been done in order to make these larger figures more uniformly comparable among themselves (in some cases the "estimated" populations have been available only in thousands) and also to avoid any impression of fictitious precision in these grand totals, which are made up of smaller subtotals of varying degrees of accuracy. Where possible, the subtotal population figures in tables 1, 2, and 3 have been carried out to hundreds and tens, in order to facilitate checking their cross-additions against the grand totals. In some cases it is doubtful whether these subtotals were sufficiently accurate to justify carrying the number of significant figures shown.

The data summarized in the tables include all communities having organized sewer systems serving a resident population of 100 or more people. Corresponding data for institutional or other semipublic systems serving more than 100 resident population have been listed in the detailed tabulations for individual States, but have not been included in this summary. Other information contained in the detailed tabulations but not in this summary includes: (*a*) Rated design capacities of treatment plants; (*b*) total populations for which treatment plants are designed; (*c*) population equivalents of industrial wastes where these figures have been available; (*d*) details concerning the methods of treatment followed at individual plants; (*e*) the name or location of the watercourse into which raw or treated sewage is discharged by each community; and (*f*) the name of the drainage basin in which such watercourse is located. This information is of such a nature that it does not lend itself readily to inclusion in a general summary of the type here presented.

In the summary tables, considerable variations are noted in the extent of development of sewerage services in the different States and geographical areas of the country and likewise in the engineering practices followed in connection with these services. A detailed analysis of the summarized data from this viewpoint will be presented in a future publication, though a few brief comments of a general nature appear to be desirable here.

The total census population of the 8,518 served communities listed in the summary is given in table 1 as 75,728,000, on the basis of the United States census of 1930. This figure represents about 62 percent of the total population for the same year. The estimated total population connected to sewer systems, amounting to 70,506,000, probably is fairly up-to-date as of 1939–40, as this figure is based on the latest records of the various States at the time of compiling the present data. On this basis and that of the United States Census of 1940, it is estimated that roughly 55 percent of the total population and 95 percent of the urban population of the country is served by public sewer systems. Of these systems, about 91 percent are publicly owned and 76 percent are of the separate type.

The figures given on the methods of sewage disposal indicate that, considering the country as a whole, an estimated population of 40,618,000, or about 58 percent of the total connected population, is served by sewage treatment of all kinds and the remaining 42 percent by no treatment. Of the total population served by treatment, about 18,386,000, or 45 percent of this total, are served by primary treatment plants and 55 percent by some form of secondary treatment. Under primary treatment, sedimentation in all forms accounts for about 82 percent of the population thus served. Of this large proportion, separate tank treatment serves 58 percent, Imhoff tanks 33 percent, and septic tanks the remaining 9 percent. Under secondary treatment the activated-sludge and trickling-filter methods predominate, the former serving 47 percent and the latter, 38 percent, or both combined, 85 percent of the total population served by secondary treatment. Plants furnishing chlorination serve a population of 14,336,000, or about 35 percent of the total population served by all forms of treatment.

Although connected populations are not given in the summary for various methods of sludge disposal, the figures in table 4 show that a total of 5,403 plants, or about 97 percent of the total treatment plants, provide sludge digestion, and 3,522 plants, or 63 percent of the total, some form of sludge dewatering and disposal. It thus appears that the disposition of the solid matters resulting from sewage treatment is now receiving much more attention throughout the country than was the case a relatively few years ago.

As a whole, the census data here summarized indicate very substantial progress in the treatment of community sewage during recent years in practically every State of the Union. In some States, notably Illinois, Maryland, Minnesota, Texas, and Wisconsin, the proportion of the total sewered population now served by treatment is extremely high, approaching 90 percent or more. In several other States, the present situation is almost as favorable as in those above named. Nevertheless, the discharge of raw sewage and of inadequately treated effluents into our coastal and inland waters still constitutes a sanitary problem of great importance, as is attested by the deteriorated condition of many natural waterways in the more populous sections of the country.

The data on which the census has been based have been furnished and checked by the sanitary engineering divisions of the departments of health in the various States listed in the summary tables. Grateful acknowledgment is due to the personnel of these organizations who have collaborated both willingly and effectively in the very considerable task of compiling the census data for their respective States. In this connection, it should be noted that in a majority of cases the original tabulations of data were made by assistants employed with the State sanitation divisions, at the cost of much time and effort. In some instances the records of the divisions were made available to representatives of the Public Health Service for transcription. The final tabulations were submitted to the various State divisions, where they were checked, corrected, and returned to the Cincinnati station for mimeographing. The summaries herein presented were prepared only after this checking process had been completed.

It thus is apparent that the collection of the census data would have been impracticable without the active collaboration of the States concerned. It is hoped to keep the census up-to-date each year by compiling annual supplements showing new installations and additions to existing plants. At intervals of 5 or 10 years, this information can be incorporated into a complete inventory, brought up-to-date. Although some of this work may have to be curtailed during the war period, it is hoped that the plan indicated may be followed as an ultimate objective.

MILK CONTROL IN THE DEFENSE PROGRAM[1]

By A. W. Fuchs, *Senior Sanitary Engineer, United States Public Health Service*

NEED FOR GREATER MILK PRODUCTION

Never before has milk been more widely used in this country than it is today. The newer knowledge of nutrition has firmly elevated this most nearly perfect food to a stellar role in the national diet. Recognition of its value by our military authorities and by the rank and file of the armed forces has resulted in a greater per capita as well as a greater total consumption of milk and its products by our troops than at any other time in our history. At the same time improved economic conditions in centers of defense industries have been accompanied by unprecedented increases in the demand for milk. Last, but not least, there must be taken into account the large shipments of milk in concentrated form to our allies overseas. It is not to be wondered, then, that some sections of this country are experiencing a shortage of fluid market milk.

The need for greater milk production during the present emergency is evident, and higher production goals have been set by the Secretary of Agriculture. In the December 30, 1941, issue of the weekly magazine "Victory," the Secretary makes the following statement:

> Total milk production in 1942 is expected to be the largest on record. This increase will result partly from an expected 3-percent increase in the number of milk cows on farms. The production of manufactured dairy products in 1942 probably will be the largest on record, mainly because of prospective larger export needs under the lease-lend program. Production of American cheese and evaporated milk probably will increase most. A milk production goal of 125 billion pounds (7 percent above probable production in 1941) has been recommended for 1942. This quantity of milk would provide not only for the increased requirements for exports in 1942 but also for a record per capita consumption of milk and other dairy products.

SCARCITY OF CRITICAL MATERIALS USED IN DAIRY EQUIPMENT

This goal of greater milk production must be achieved in the face of a shortage of certain critical materials used in the manufacture of dairy equipment. As is well known, the quantities of war materials required are so vast that it has become necessary for the Government to institute a system of rationing whereby materials not available in sufficient quantities to satisfy all demands are allocated to various uses in the order of their importance to the national defense. The War Production Board has included the dairy equipment industry among the vital civilian industries and services entitled to some degree of priority. Under the recent Preference Rating Order

[1] From the States Relations Division Read at the annual meeting of the Connecticut Association of Dairy and Milk Inspectors at Hartford, Jan. 13, 1942.

P-100, which replaces the former P-22, dairy plants are privileged to use an A-10 rating for maintenance of plant operation, repairs of equipment, emergency inventory, or operating supplies. This rating does not, however, cover new equipment for expansion of capacity. However, fabricators can apply under PD-25A for the privilege to manufacture new equipment and repair parts for stock purposes on a quota basis. A Dairy Industries Advisory Committee has recently been nominated to discuss with the War Production Board the problems confronting the industry.

Since first preference is given to dairies awarded defense orders, and since a shortage of practically all metals used in the manufacture of dairy equipment is developing, the wisest course for dairy plant operators to follow seems to be that of keeping existing equipment in the highest state of repair. Dairy plants are apparently assured of securing the necessary repairs, and, for the time being at least, of obtaining replacement of units, but every indication points to the advisability of determining future needs and placing orders well in advance to avoid delays.

In this program of conservation the cooperation of milk inspectors with the dairy industry is essential. Surgeon General Parran of the United States Public Health Service addressed the following letter on this subject to all State health officers under date of October 6, 1941:

My attention has been called to the tendency of some milk control officials to demand compliance by the dairy industry with dairy and milk plant equipment specifications which may not be too stringent in normal times but which may be unreasonable under present circumstances. I am sure this attitude is due simply to the failure to realize that the present emergency requires the fullest cooperation of milk control authorities and the dairy industry in the interest of national defense

The unobstructed and increasing flow of milk and dairy products is necessary for a successful defense effort More and more of these concentrated vital foods will be needed for the military forces and defense workers at home and for export overseas. At the same time it has been necessary for the Government to place under strict control and to conserve for defense purposes certain materials used for dairy and milk plant equipment, such as aluminum, nickel-bearing steel, tin, and electric motors. Milk plants using aluminum foil must take immediate steps to obtain equipment which will provide other means of closing their bottles. Certain dairy equipment containing other restricted metals may be obtainable only in limited quantities and after considerable delay. In the meanwhile the Dairy Industries Supply Association is cooperating with the Office of Production Management in attempting to work out suitable substitutes to relieve shortages of critical materials.

Accordingly, the path along which each milk control officer can contribute to the defense effort should be plain. A change from aluminum to other satisfactory milk bottle closures and the development of other satisfactory substitutes for dairy equipment materials should be encouraged rather than condemned. Unusual features of equipment which would require radical changes either in design or in tooling should not be specified. Immediate replacement of milk cans and

milk equipment which though imperfect are still safely usable should not be insisted upon. Instead, the dealer should be assisted in determining now his future needs so that orders may be placed well in advance. All of this may be accomplished without significantly jeopardizing the essential safety of the milk supply.

I sincerely believe that merely calling this emergency situation to the attention of health officers will elicit their wholehearted cooperation in advancing the national defense effort.

This letter was written prior to the declaration of war by the United States, and before the scarcity of certain materials became as critical as it is today. Milk control officials may have to recede even farther from their peace-time standards for dairy equipment if the materials normally used become completely unavailable by virtue of war-time necessity. Without question the primary goal must be to win the war. Nevertheless, there is little justification for the attempt on the part of some milk dealers to take undue advantage of Dr. Parran's plea for cooperation by urging health officers to accept certain practices which would significantly jeopardize the essential safety of the milk supply but in which no critical materials are involved and for which no real need has yet been demonstrated.

An outstanding example has been the effort of dealers in a number of cities to bring about the discontinuance or suspension of the lip-cover cap requirement now in effect in many cities. The current edition of the milk ordinance recommended by the Public Health Service requires, for grade A pasteurized milk and milk products, that the cap or cover shall cover the pouring lip of the container to at least its largest diameter. The public health reasons for this requirement are: (1) To protect the normal pouring lip of the container from contamination by handling, and (2) to prevent the sucking back into the container by temperature contraction of any contaminated liquid which may be on the cap, or of any milk which may previously have been squeezed out by temperature expansion. In a bacteriological study by Isaacs and Zeiber (Am. Jour. Hyg., **16**: 806 (1932)), it was found that the disc caps on commercially distributed bottled milk often became contaminated with large numbers of bacteria, including in a majority of cases coliform organisms of the fecal type. These investigators also found that ink placed on the cap of a bottle in the process of cooling is drawn into the bottle as cooling proceeds and tends to sink through the cream layer and to some depth in the milk. Furthermore, a study of outbreaks of milk-borne disease compiled by the Public Health Service reveals that in seven outbreaks contamination of the top of the bottle may have been responsible, and that the use of lip-cover caps might have prevented the outbreaks. An additional outbreak recently reported by the health officer of a large New England city as having occurred in 1926 was traced to a typhoid carrier who delivered pasteurized milk in bottles with disc caps; the organism

was isolated by swabbing the pouring lip and the top of the bottle, was also present in the bottled milk, but was not found in the milk before bottling. That more outbreaks have not been traced to such contamination may be due to the great difficulty, epidemiologically, of tracing outbreaks to such a source. For these reasons many health officers have expressed opposition to the discontinuance of cover caps unless such a step should become absolutely necessary.

The milk dealers who advocate suspension of the lip-cover requirement argue that a shortage of cover caps and cappers may be expected. It is true that there are shortages of paper and pulp and that voluntary conservation programs are being sponsored by the War Production Board. The Paper and Pulp Branch of the War Production Board stated, however, that there was every indication that it would be unnecessary to apply restrictions to cover caps or paper milk bottles. The Public Health Service has recommended that if control of paper becomes necessary, preference should undoubtedly be given to cover caps. Where lip-cover caps are now employed the return to disc caps would effect an insignificant saving in paper and would, on the other hand, require a change in capper heads that would be wasteful of critical metals.

The question was also recently discussed with manufacturers, who gave assurance that all types of paper cover caps as well as capper heads for applying them will continue to be available, although there may be some difficulty in obtaining hood-type caps and capping machines. No difficulty is contemplated if dealers place orders reasonably in advance of the required delivery date. Such delays as have been experienced, coupled with less aggressive efforts by cover cap manufacturers to obtain new customers, may have been responsible in part for the unfounded shortage rumors. However, the chief source of the rumors has evidently been the desire of some milk dealers to economize by using the cheaper disc caps while placing the blame on "the emergency."

Accordingly, health officers who inquire regarding the desirability of enforcing or adopting the cover-cap requirement are being advised by the Public Health Service to allow a reasonable time for compliance, after which the dairyman should be penalized for violations unless he can prove that he has ordered the necessary equipment and caps from all possible sources and is unable to obtain delivery.

PROTECTION AGAINST AIR RAIDS AND SABOTAGE

Because of the importance of milk in the national diet, every precaution should be taken to safeguard municipal milk supplies against possible war-time interruptions. Most of us prefer not to be alarmists, but the many examples of the results of unpreparedness

in this war indicate the value of planning for all contingencies that can be foreseen.

The remoteness of the danger from air raids on our coastal States is a matter of opinion. Nevertheless, they are a possibility against which it would be foolish to be unprepared. As a result of a recent conference with representatives of the Office of Civilian Defense in Washington, it is suggested that prearranged plans be made for the following actions to reduce interruptions of the milk supply by air raids:

(1) Plan for emergency pasteurization of all milk.

(2) Milk inspectors should work through the milk dealers' associations to plan interchange of equipment and services. A milk plant would not be selected as a direct target, but if one is struck accidentally other plants would be able to help out, since most plants are not operating at full capacity.

(3) Plans might even be made for a pasteurization reserve in neighboring cities or in cheese, ice cream, and butter plants.

(4) Plan to scatter delivery vehicles rather than housing them in one central location.

(5) Arrange with the water supply superintendent and health officials to notify the milk plants promptly whenever there is an interruption in the water supply or when the supply becomes unsafe, and plan for emergency treatment or an alternate source.

(6) Although the milk producing farms are not vulnerable in significant numbers to air attack, plans should be made for rerouting the collecting routes in case bridges and roads are destroyed.

(7) To provide against a possible shortage of raw milk, arrange for the temporary emergency use of the raw supply of manufacturing plants such as cheese, ice cream, and butter plants, if that should become necessary.

(8) Under war-time conditions the dairy industry must conserve materials and manpower wherever possible. More attention may well be devoted to the maintenance of equipment. Unnecessary frills employed for competitive reasons, such as special deliveries, may well be eliminated, and 6-day deliveries adopted. The shortage of rubber for tires may require extreme conservation measures, such as every-other-day deliveries, combination of delivery routes, or even complete cessation of home deliveries except by horse-drawn carts.

(9) If plant operators or other key employees belong to organizations which might interfere with their plant duties, arrangements should be made for their replacement. Better still, such employees should not join such organizations, as they are of greater value to their community as plant men.

(10) Milk plants should cooperate with air raid wardens in instituting the usual precautions, including those against incendiary bombs.

Poison gas has, fortunately, not been employed so far in the present war, but a desperate enemy may be driven to use it as a last resort. A few words regarding its effect on milk may not be amiss.

The nonpersistent gases (i. e., those readily dispersed by wind, air currents, and rain), such as chlorine and phosgene, produce damage to the lungs when inhaled, and although foods may absorb them to some extent on exposure to fairly high concentrations they are seldom rendered unfit for consumption. Even prolonged exposure to high concentrations of nonpersistent gas of the phosgene type, such as might easily occur in a confined space, is more likely to impair the palatability of food than to render it unwholesome. Milk so exposed may have its taste slightly affected, but its palatability can be restored by boiling. Cheese and butter may bleach slightly at the surface, but when the bleached portions are cut away the remainder is edible.

More dangerous to foodstuffs are the persistent liquid blister gases, of which the outstanding representative is mustard gas, which cause incapacitation by producing acute inflammation of the skin, eyes, and throat. Nonarsenical blister gases are rapidly absorbed by uncovered fatty foodstuffs, including milk, cream, and cheese, so as to render them unpalatable, and since there is no effective treatment, fatty foods so contaminated are probably dangerous. Foods that have been in contact with arsenical blister gases of the lewisite type should be regarded with the greatest suspicion, as there is considerable danger of arsenical poisoning.

The protective value of the food packages commonly employed increases with the imperviousness of the material and the tightness of the cover. Sealed cans or metal drums give complete protection against all types of gases. Waxed cartons if well sealed afford good protection. Fairly good protection is given by cans with well-fitting lids and by glass bottles covered by greaseproof paper.

More complete information on this subject may be found in the pamphlet "Food and Its Protection against Poison Gas," released by the Ministry of Food and published in 1941 by His Majesty's Stationery Office, London. An interesting article, "The Detection of War Gases in Foodstuffs," appeared in the February 1941 issue (vol. 66, No. 779) of the Analyst, which is the journal of the Society of Public Analysts, published by Heffer and Sons, Cambridge, England. Decontamination of foods and buildings is discussed in the July 1941 number of the Journal of the Royal Sanitary Institute (London). Additional information on war-time protection of foods is to be issued to State defense councils and State health departments by the Office of Civilian Defense.

The danger from sabotage is probably more real at the moment than the possibility of destruction of milk plants by bombing attacks or the contamination of milk by gas bombs. In an article in the

November 1941 issue of the Journal of the American Water Works Association, J. Edgar Hoover suggests that consideration be given to some of the more common forms of sabotage that might be attempted against water supplies, and some of these are equally applicable to milk supplies.

Sabotage at individual farms on the milk shed can have no important effect, but some thought might be given to collection routes, receiving stations, and particularly pasteurization plants. The pasteurization of all milk supplies is probably the most effective measure against bacterial sabotage of raw milk supplies. It should be remembered, however, that while pasteurization destroys the usual milk-borne pathogens, it has its limitations, hence plants should protect their raw storage tanks by locking them over night or by other effective means. Bacterial sabotage of pasteurized supplies is possible by the introduction of organisms into the pasteurization vat, surface coolers, bottlers, or individual bottles or cans, but this could endanger limited quantities only unless repeated.

A recent circular on the prevention of sabotage in milk plants issued by the State Department of Health of Kentucky discusses the investigation of milk plant employees and milk truck drivers, citizenship status of employees, control of visitors and strangers, close watch of operating equipment and of stored containers, adequate reserve of replacement and consumable materials, employment of guards, test operation of standby parts, emergency water and power supplies. The circular suggests that in the event any situation arises with relation to a milk supply which looks suspicious, immediate contact should be made with the health officer and the nearest office of the Federal Bureau of Investigation.

SANITATION OF MILK SUPPLIES FOR ARMY CAMPS AND DEFENSE INDUSTRIES

No discussion of milk control in the defense program would be complete without some mention of the safeguards surrounding the milk supplies consumed by our military forces and by the workers in our defense industries.

For several years before the present emergency, Army and Civilian Conservation Corps camps purchased milk under Federal Specification C–M–381b for fresh milk, applicable to all Government departments and agencies. The Army specifications required the purchase of Type II pasteurized milk wherever available, otherwise Type III was to be obtained. Type II was milk conforming to the specifications for grade A pasteurized milk as defined in the current edition of the United States Public Health Service Milk Ordinance and Code. Type III was milk pasteurized in plants conforming to the pasteurization plant specifications of the current Public Health Service Milk

Ordinance and Code, but which had a bacterial count limit of 50,000 per cc. after pasteurization, and for which the producing farm standards were rather meager.

In certain sections of the country, as in the northeast, where the Army could not obtain grade A pasteurized milk conforming to the Public Health Service specifications, it had no alternative but to purchase Type III milk, even where a higher quality milk was locally available. To correct this situation, circular letter 134 issued by the Quartermaster General July 5, 1941, defines two classes of Type II pasteurized milk. Type II No. 1 is grade A pasteurized milk conforming to the Public Health Service specifications and produced in an area which has formally adopted the Milk Ordinance recommended by the Public Health Service. Type II No. 2 is the first quality pasteurized milk as defined in the local milk ordinance at the point of delivery. This order also provides that Type II No. 1 shall be purchased whenever this grade is available in adequate quantity and provided that cost is not greatly in excess of the cost of Type II No. 2, otherwise the latter is to be purchased. Type III is purchased when neither Type II No. 1 nor Type II No. 2 is available.

It may be of interest to compare the extent of the sanitary control of milk supplies for use by the military forces and defense industries in the first World War with present conditions. During the 1917–18 emergency, milk control was almost entirely limited to the larger cities. Except in the latter, practically no pasteurized milk was available. The milk sanitation program of the Public Health Service had not yet been developed, and no uniform milk sanitation standards were in general use. Instead, milk control was in a chaotic condition, with practically no two areas recognizing the same standards for the same grade. Local health services and qualified personnel experienced in milk sanitation were virtually unknown except in the larger centers of population. Under these conditions, adequate supplies of fresh milk of high sanitary quality were out of the question for most of the training camps, and it was necessary to resort to canned milk.

Great progress in milk sanitation has been made since those days. The Government program for the eradication of bovine tuberculosis, begun about that time, has recently reached the stage where every county in the United States is a modified accredited tuberculosis-free area. Considerable work has been done in recent years in the control of Bang's disease. The use of pasteurized milk has steadily increased until today probably 80 percent of the fluid market milk is pasteurized. And last, but by no means least, official recognition of the importance of milk sanitation has led to the wider adoption of modern milk-control legislation and the organization of milk-control departments not only in our large cities but also in many smaller communities and rural counties.

With the latter development the work of the Public Health Service is intimately related. Milk sanitation became a definite activity of the United States Public Health Service in 1923, when Leslie C. Frank was assigned to Alabama, at the request of the State health officer, to assist in formulating a model milk ordinance to be recommended for adoption by local communities. The work in Alabama soon attracted the attention of neighboring States and adoptions of the Standard Milk Ordinance grew apace. In 1926 this model was adopted as a standard for the United States by the Conference of State and Territorial Health Officers. To standardize the interpretation and enforcement of the milk ordinance the first interpretative code was formulated in 1927, and since that time several revised editions of the Milk Ordinance and Code have been issued as a result of improvements suggested through experience and research after approval by the Public Health Service Milk Sanitation Advisory Board. Voluntary adoptions of the recommended ordinance have steadily increased, until at the present time it is in effect in communities ranging in population from less than 1,000 to about 3,500,000 in 35 States. It has been adopted State-wide in 1 State, and by 104 counties and 851 municipalities. It has also been adopted as State regulations by several States, but in these cases enforcement is usually left to the local communities.

It was early recognized that mere adoption does not insure uniform and proper enforcement. Of even greater value were the measures adopted for promoting good enforcement. These include, first, the development of a uniform milk-sanitation rating program whereby States can measure the extent to which city milksheds comply with the requirements of the ordinance. The communities which are awarded a milk-sanitation rating of 90 percent or more by the States are published semiannually in PUBLIC HEALTH REPORTS. This list is useful in acquainting areas experiencing a milk shortage with sources from which satisfactory supplies can be obtained and is offered as a means for overcoming existing multiple inspections and trade barriers. Secondly, the Public Health Service undertook to promote the organization of milk sanitation divisions in State health departments. In recent years many States have been able to employ qualified milk sanitarians through funds made available by Title VI of the Social Security Act. The State milk sanitarians are offered training and advisory assistance through the Washington office and through district milk specialists. The State milk sanitarians, in turn, train local inspectors, provide consultation service to communities, and make milk-sanitation ratings. Thirdly, the Public Health Service has conducted regional milk-sanitation seminars in collaboration with the States, at which State and local milk inspec-

tors devote 5 days to an intensive study and discussion of the recommended program.

When construction of Army camps for selectees was begun in 1939, reconnaissance surveys of the public health organization and needs of each of the camp areas and of the defense industry areas were made by the Public Health Service, and where needed such organizations were established by the States with the help of personnel employed by the Public Health Service from Emergency Health and Sanitation funds. Mobile trailor laboratories of the Public Health Service stationed in some of the Army maneuver areas have rendered valuable service in examining milk and water samples where laboratory facilities were lacking. In addition, a bacteriologist of the Public Health Service is surveying milk laboratories in defense areas throughout the country with a view to obtaining closer compliance with the Standard Methods for the Examination of Dairy Products of the American Public Health Association. The Army veterinarians who are charged with the inspection of the milk supplies purchased by the Army obtain excellent and valuable cooperation from the local health units in the defense areas and from most State health departments.

As a result of these efforts many sections of the country where camps and defense industries are located have available supplies of fresh milk meeting the Type II No. 1 Army specifications. With but few exceptions, adequate and safe milk supplies are available to the armed forces and to defense industries during the present emergency.

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

February 1–28, 1942

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the PUBLIC HEALTH REPORTS under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended February 28, 1942, the number reported for the corresponding period in 1941, and the median number for the years 1937–41.

DISEASES ABOVE MEDIAN PREVALENCE

Measles.—The number of cases of measles reported during the 4 weeks ended February 28 was 61,149, an increase of approximately 25,000 over the preceding 4-week period. Each section of the country

contributed to the increase, but the largest numbers of cases were reported from the South Atlantic, West South Central, and Pacific regions. While the current figure was more than 15 percent below the incidence in 1941, it represented an increase of approximately 15 percent over the 1937–41 median incidence for this period. In the East North Central and East South Central regions the incidence was relatively low, but in other regions the excesses ranged from 1.3 times the average incidence in the New England region to more than six times the 1937–41 median figures in the West South Central and Pacific regions.

Meningococcus meningitis.—For the current 4-week period there were 273 cases of meningococcus meningitis reported, as compared with 188, 178, and 227 during the corresponding period in 1941, 1940, and 1939, respectively. While an increase of this disease is normally expected at this season of the year, the current incidence was about 45 percent above last year's figure for this period and approximately 20 percent above the average seasonal incidence. All regions except the North Central and East South Central regions reported an increase over the normal seasonal expectancy. With the exception of Texas in the West South Central region, reporting 40 cases, the States reporting the highest incidence were located in the Atlantic Coast regions; New York reported 29 cases, Pennsylvania 20 cases, Maryland 18 cases, and Virginia 15 cases.

Poliomyelitis.—The incidence of poliomyelitis (101 cases) stood at the same level as last year, but it was about 20 percent above the average seasonal level. The incidence was relatively high in the North Atlantic and East North Central regions, but in all other regions the situation was very favorable. While the numbers of cases were not large, the number (9) in the New England region was four and one-half times the average number for preceding years; in the Middle Atlantic the number (19) was two and one-half times the 1937–41 median figure, and in the East North Central region the number (17) was one and one-half times the seasonal expectancy. As these were the last regions reached by the recent rise of this disease it is most likely that the incidence in those regions has not yet declined to a normal level.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The number of cases of diphtheria (1,116) reported for the 4 weeks ended February 28 was only slightly below the number recorded for this period in 1941, but it was less than 60 percent of the 1937–41 median figure for the period. While the incidence in the New England, South Atlantic, and West South Central regions was higher than in 1941, in those regions as well as all others the incidence was low in comparison with the average incidence of preceding years.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period Feb. 1–28, 1942, the number for the corresponding period in 1941, and the median number of cases reported for the corresponding period, 1937–41

Division	Current period	1941	5-year median	Current period	1941	5-year median	Current period	1941	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	1,116	1,171	1,994	22,139	146,496	71,176	61,149	72,972	53,546
New England	23	7	36	29	1,712	122	4,084	2,433	3,191
Middle Atlantic	173	191	331	137	5,152	552	7,860	29,698	5,818
East North Central	163	195	384	495	7,383	6,121	4,209	24,059	5,799
West North Central	76	106	146	209	6,558	836	5,732	1,932	8,724
South Atlantic	237	190	383	6,557	74,515	15,524	12,552	7,041	7,041
East South Central	104	195	178	2,825	18,018	5,571	1,269	2,975	1,494
West South Central	218	106	296	9,254	23,945	23,945	10,565	1,708	1,708
Mountain	62	98	86	1,999	4,473	1,528	3,209	1,319	1,860
Pacific	60	83	124	634	4,740	4,740	11,669	1,807	1,807
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	273	188	227	101	101	89	16,160	13,812	22,169
New England	29	13	12	9	2	2	1,835	771	1,539
Middle Atlantic	61	29	51	19	8	7	3,945	3,824	5,682
East North Central	20	13	19	17	22	11	4,801	4,571	8,245
West North Central	11	12	19	2	12	7	1,880	1,282	2,507
South Atlantic	57	45	45	11	24	17	1,293	1,051	1,051
East South Central	23	43	51	14	7	14	687	853	623
West South Central	52	22	22	13	11	11	383	350	439
Mountain	8	3	11	7	5	5	647	430	734
Pacific	12	8	10	9	10	10	689	680	1,304
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	87	188	1,220	330	247	390	15,121	16,349	[3] 15,162
New England	0	0	0	19	12	12	1,758	1,256	1,367
Middle Atlantic	0	0	0	46	29	50	3,652	2,982	3,912
East North Central	8	72	196	39	29	44	3,625	3,151	2,938
West North Central	15	77	254	15	15	18	669	1,120	873
South Atlantic	3	0	5	132	45	74	1,981	2,940	2,410
East South Central	22	5	13	26	30	37	580	673	514
West South Central	36	16	36	37	46	77	610	1,536	996
Mountain	2	17	126	5	20	19	769	804	856
Pacific	1	1	95	11	21	23	1,477	1,827	1,305

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded
[3] 4-year (1938–41) average.

Influenza.—The incidence of influenza (22,139 cases) for the country as a whole was comparatively low, the number of reported cases for the current period being less than one-third of the average seasonal incidence (approximately 71,000 cases) for this period. Compared with 1941 the current incidence is particularly low as an epidemic of influenza that had started in the West had reached the North Central and North Atlantic regions during the period corresponding to the current one. The highest incidence is still confined to the South Central and South Atlantic regions, there being no sign as yet that the disease has spread into any other region. Of the total number of cases, approximately 7,000 were reported from Texas, 3,300 from South Carolina, 2,400 from Alabama, and 2,200 from Virginia—making a

total of approximately 15,000 cases reported from those 4 States. Arizona and Wyoming seemed mostly responsible for a slight increase over the seasonal expectancy in the Mountain region.

Scarlet fever.—For the current period there were 16,160 cases of scarlet fever reported, as compared with 13,812, 19,277, and 22,169 cases for the corresponding period in 1941, 1940, and 1939, respectively. The number of cases was higher than last year in all regions except the East South Central, but that region with the New England and South Atlantic were the only regions reporting an excess over the 1937-41 median incidence for this period. The excess in the New England region seemed to be largely due to an unusual prevalence of the disease in Massachusetts; the approximately 1,400 cases occurring in that State represented about a 75-percent increase over the preceding 5-year average incidence for this period.

Smallpox.—Again smallpox stood at a relatively low level, 87 cases being reported for the current period as compared with 188 cases in 1941 and 1,220 cases representing the 1937–41 median incidence for the corresponding period. Of the total of 36 cases reported from the West South Central region, 31 occurred in Texas. For the country as a whole the incidence was the lowest on record for this period.

Typhoid fever and paratyphoid fever.—The incidence of typhoid fever was also relatively low, the number of cases (330) being about 15 percent below the normal seasonal expectancy. Two regions reported excesses over the 1937–41 median figures for the period; in the New England region the increase was slight, but the number of cases (132) in the South Atlantic region represented an increase of about 80 percent over the average for recent years; of the total cases reported for that region, 91 occurred in Georgia and 18 in Florida.

Whooping cough.—The number of reported cases of whooping cough was about normal for this season of the year—15,121 cases for the 4 weeks ended February 28, as compared with 16,349 in 1941 and an average of 15,162 cases for the corresponding period in the 4 preceding years. Of the nine geographic regions, the New England, East North Central, East South Central, and Pacific regions reported excesses over the seasonal expectancy, while in the other five regions the incidence was relatively low.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended February 28, based on data received from the Bureau of the Census, was 12.6 per 1,000 inhabitants (annual basis). The mild form of the influenza that has been prevalent in certain regions of the country is no doubt reflected in the current low death rate. In 1941 the rate for the period corresponding to the current one was 13.6 and the average rate for this period in 1939–41 was also 13.6.

DEATHS DURING WEEK ENDED MARCH 7, 1942

[From the Weekly Mortality Index issued by the Bureau of the Census, Department of Commerce]

	Week ended Mar 7, 1942	Corresponding week, 1941
Data from 88 large cities of the United States		
Total deaths	9 272	9,104
Average for 3 prior years	9 383	
Total deaths, first 9 weeks of year	83 444	87,500
Deaths per 1,000 population, first 9 weeks of year, annual rate	12 9	13 6
Deaths under 1 year of age	648	552
Average for 3 prior years	519	
Deaths under 1 year of age first 9 weeks of year	5,137	4 907
Data from industrial insurance companies		
Policies in force	64 951 480	64 655 691
Number of death claims	13 466	13 532
Death claims per 1 000 policies in force, annual rate	10 8	10 9
Death claims per 1 000 policies, first 9 weeks of year, annual rate	10 2	11 2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED MARCH 14, 1942

Summary

Current reports show no unusual incidence of any of the important communicable diseases, although measles, meningococcus meningitis, and poliomyelitis continue slightly above the 5-year (1937–41) median.

A total of 88 cases of meningococcus meningitis was reported for the current week, as compared with 70 last week and a 5-year median of 52. The current figure is the highest for the corresponding week since 1937, when 210 cases were reported. The following 3 States reported 10 or more cases during the current week: Virginia, 10; New York, 12; Texas, 13. Massachusetts (7 cases) was the only other State which reported more than 4 cases.

The number of reported cases of poliomyelitis dropped from 23 to 18, with only one State (South Carolina 3) reporting more than 2 cases.

A total of 5,101 cases of influenza was reported as compared with a 5-year median of 6,740. Texas (1,712), South Carolina (705), and Virginia (637) reported the largest numbers. Of 16 cases of smallpox, 8 were reported in the North Central States.

Other diseases reported currently include 78 cases of bacillary dysentery (Texas 45, Georgia 14), 15 cases of amebic dysentery (Texas 6), 38 cases of unspecified dysentery (Virginia 27, Arizona 10); 1 case of anthrax in Massachusetts, and 12 cases of Vincent's infection in Maryland. No cases of Rocky Mountain spotted fever were reported, and only 5 cases have been reported this year to date.

The crude death rate for the current week for 88 large cities in the United States is 13.2 per 1,000 population, as compared with 12.9 for the preceding week and 12.8 for the 3-year (1939–41) average. The cumulative rate to date this year (first 10 weeks) is 13.0, as compared with 13.5 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended March 14, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Mar. 14, 1942	Mar. 15, 1941		Mar. 14, 1942	Mar. 15, 1941		Mar. 14, 1942	Mar. 15, 1941		Mar. 14, 1942	Mar. 15, 1941	
NEW ENG.												
Maine	0	0	2	-----	1	12	205	94	94	2	0	0
New Hampshire	1	0	0	----	3	-	21	23	23	1	0	0
Vermont	0	0	0	-		-	9	18	18	0	0	0
Massachusetts	5	2	2		-		615	811	810	7	2	1
Rhode Island	0	0	0				210	5	9	0	1	1
Connecticut	0	1	1	2	4	9	307	61	156	0	0	0
MID ATL												
New York	28	12	33	[1] 12	[1] 54	[1] 47	578	7,605	1,482	12	3	7
New Jersey	3	10	10	14	36	28	384	2,549	1,186	4	0	1
Pennsylvania	10	17	44				925	4,958	299	3	7	7
E. NO CEN												
Ohio	9	6	17	21	98	98	299	5,704	137	4	2	2
Indiana	4	21	16	32	30	61	71	• 627	10	2	1	0
Illinois	16	24	33	8	44	44	505	4,152	113	1	4	4
Michigan	5	3	9	32	33	23	248	4,416	373	2	1	1
Wisconsin	2	0	2	44	200	200	719	838	781	0	0	0
W. NO CEN.												
Minnesota	1	0	8	1	29	6	823	11	68	0	0	0
Iowa	8	6	4	13	136	28	323	175	175	0	0	1
Missouri	2	6	18	8	11	109	465	151	14	0	1	1
North Dakota	1	2	4	9	21	21	128	13	9	0	0	0
South Dakota	4	0	1		6	2	5	27	4	0	0	0
Nebraska	2	2	2	48	15	15	167	6	12	0	0	1
Kansas	8	2	4	21	13	31	460	661	417	2	1	0
SO ATL.												
Delaware	0	0	0		-		7	351	28	0	0	0
Maryland [2]	2	3	5	20	41	53	611	170	170	3	1	1
Dist of Col	0	5	6	2	5	5	51	126	30	2	1	1
Virginia	12	14	12	637	1,077	552	282	1,971	401	10	2	2
West Virginia	6	6	6	40	72	72	443	360	17	2	2	2
North Carolina	5	7	16	16	83	83	1,459	921	921	0	0	1
South Carolina	3	6	4	705	754	774	225	278	44	3	1	2
Georgia	5	9	9	119	257	257	320	421	254	0	2	1
Florida	0	6	7	10	159	9	207	973	92	1	0	0
E SO CEN.												
Kentucky	10	4	8	20	135	135	73	1,317	102	2	1	1
Tennessee	5	4	4	123	161	238	118	339	117	2	2	2
Alabama	6	6	9	354	316	335	110	481	896	1	2	3
Mississippi [2]	70	8	5		---	---	----	------	-----	1	2	1
W. SO CEN.												
Arkansas	7	9	9	280	291	291	353	238	39	0	0	0
Louisiana	4	5	9	27	76	76	136	61	26	1	2	2
Oklahoma	8	12	7	94	207	337	515	14	25	1	2	1
Texas	57	30	38	1,712	1,361	968	2,815	1,416	416	13	1	1
MOUNTAIN												
Montana	0	7	2	38	11	11	80	5	46	1	1	0
Idaho	0	1	1		-------	5	85	44	39	0	0	0
Wyoming	0	1	0	197	--	- -	59	19	19	0	0	0
Colorado	6	10	10	88	44	29	256	214	200	0	0	0
New Mexico	2	5	2	3	5	7	118	187	89	0	0	0
Arizona	0	0	2	182	105	105	170	136	95	0	0	0
Utah [2]	1	0	0	4	22	8	178	82	145	0	0	0
Nevada	0	0	----	-----	-------	-------	18	0	------	0	1	------
PACIFIC												
Washington	3	2	2	7	16	3	253	79	79	2	1	1
Oregon	1	1	1	10	21	34	97	442	41	0	0	0
California	23	13	26	148	404	211	4,867	231	348	3	1	3
Total	340	268	431	5,101	6,366	6,740	21,373	43,731	15,224	88	48	52
10 weeks	3,249	3,037	5,370	49,622	446,898	130,874	136,012	215,980	121,348	661	485	533

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended March 14, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis: Week ended—Mar. 14, 1942	Poliomyelitis: Week ended—Mar. 15, 1941	Poliomyelitis: Median 1937–41	Scarlet fever: Week ended—Mar. 14, 1942	Scarlet fever: Week ended—Mar. 15, 1941	Scarlet fever: Median 1937–41	Smallpox: Week ended—Mar. 14, 1942	Smallpox: Week ended—Mar. 15, 1941	Smallpox: Median 1937–41	Typhoid and paratyphoid fever: Week ended—Mar. 14, 1942	Typhoid and paratyphoid fever: Week ended—Mar. 15, 1941	Typhoid and paratyphoid fever: Median 1937–41
NEW ENG.												
Maine	0	0	0	30	7	17	0	0	0	3	0	0
New Hampshire	0	0	0	58	3	9	0	0	0	0	0	0
Vermont	0	0	0	3	8	8	0	0	0	0	0	0
Massachusetts	0	0	0	381	168	219	0	0	0	0	1	1
Rhode Island	0	0	0	15	5	18	0	0	0	0	0	0
Connecticut	0	0	0	49	52	107	0	0	0	1	1	1
MID. ATL.												
New York	1	0	0	536	524	937	0	0	0	4	5	5
New Jersey	1	0	0	208	330	232	0	0	0	2	1	3
Pennsylvania	1	0	0	649	338	649	0	0	0	7	6	6
E. NO. CEN.												
Ohio	2	0	0	758	256	370	0	0	2	8	2	4
Indiana	0	0	0	127	191	224	0	5	5	1	1	1
Illinois	1	0	1	289	516	714	4	14	14	0	0	3
Michigan	1	0	0	359	252	609	0	3	3	0	0	2
Wisconsin	0	1	1	170	166	182	1	7	7	0	1	0
W. NO. CEN.												
Minnesota	1	0	0	110	59	121	0	5	7	0	0	0
Iowa	0	0	0	58	65	198	0	1	31	1	0	1
Missouri	0	0	0	123	86	102	1	19	19	1	4	5
North Dakota	0	0	0	26	21	14	0	0	3	0	0	0
South Dakota	0	0	0	41	11	26	1	0	2	0	0	0
Nebraska	0	0	0	34	24	41	0	0	9	0	1	0
Kansas	0	0	0	130	52	127	1	1	1	0	0	0
SO. ATL.												
Delaware	0	0	0	58	16	13	0	0	0	0	0	0
Maryland [2]	0	0	0	70	36	41	0	0	0	0	1	1
Dist. of Col.	0	0	0	16	32	18	0	0	0	0	0	0
Virginia	0	0	0	50	48	36	0	0	0	0	1	2
West Virginia	0	0	0	48	46	48	0	0	0	1	0	3
North Carolina	0	0	1	43	34	28	0	0	0	1	0	0
South Carolina	3	0	0	2	5	5	2	0	0	0	10	3
Georgia	0	0	0	22	14	17	0	0	0	5	3	3
Florida	0	3	0	10	8	8	0	0	0	6	4	3
E. SO. CEN.												
Kentucky	1	0	1	98	151	96	1	0	0	1	2	2
Tennessee	2	1	0	38	153	49	0	1	1	1	3	2
Alabama	0	1	1	22	26	23	0	1	0	1	5	3
Mississippi [2]	0	0	1	15	6	5	0	2	1	0	1	1
W. SO. CEN.												
Arkansas	0	1	1	10	7	7	0	0	3	3	3	3
Louisiana	0	1	1	0	14	14	0	0	1	3	5	13
Oklahoma	0	0	0	5	13	33	1	0	16	0	1	3
Texas	0	1	2	49	74	79	1	2	2	2	7	8
MOUNTAIN												
Montana	0	1	0	19	38	36	2	0	0	0	0	0
Idaho	0	0	0	2	11	16	0	0	1	0	9	1
Wyoming	0	0	0	23	11	11	0	0	0	0	1	0
Colorado	1	0	0	49	51	44	1	1	3	0	0	0
New Mexico	0	0	0	9	5	16	0	0	1	0	0	0
Arizona	1	0	0	2	3	9	0	0	0	1	2	0
Utah [2]	0	0	0	27	16	27	0	0	0	1	0	0
Nevada	0	0	------	2	1	------	0	1	------	0	0	------
PACIFIC												
Washington	0	0	0	33	12	53	0	0	0	1	0	2
Oregon	1	0	0	11	11	24	0	2	19	2	1	2
California	1	1	1	149	170	234	0	0	11	1	5	4
Total	18	11	16	5,036	4,146	5,818	16	65	285	58	87	106
10 weeks	250	250	216	39,658	35,845	53,966	231	844	2,942	779	745	1,101

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended March 14, 1942—Continued.

Division and State	Whooping cough: Week ended— Mar 14, 1942	Whooping cough: Week ended— Mar 15, 1941	Week ended Mar 14, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	30	13	0	0	0	0	0	0	0	0	0
New Hampshire	6	11	0	0	0	0	0	0	0	0	0
Vermont	34	7	0	0	0	0	0	0	0	0	0
Massachusetts	235	227	1	0	0	0	1	0	0	0	0
Rhode Island	43	18	0	0	0	0	0	0	0	0	0
Connecticut	82	66	0	0	0	0	0	0	0	0	0
MID ATL.											
New York	487	318	0	3	3	0	1	0	0	0	1
New Jersey	243	128	0	0	0	0	0	0	0	0	0
Pennsylvania	211	402	0	0	0	0	0	0	0	0	0
E NO CEN											
Ohio	341	421	0	0	0	0	0	0	0	0	0
Indiana	27	25	0	0	1	0	0	0	0	0	0
Illinois	146	83	0	0	0	0	0	0	0	0	0
Michigan	164	351	0	0	0	0	0	0	0	0	0
Wisconsin	189	97	0	0	0	0	0	0	0	1	0
W NO CEN.											
Minnesota	59	95	0	0	0	0	0	0	0	0	0
Iowa	55	51	0	0	0	0	0	0	0	0	0
Missouri	22	65	0	1	1	0	0	0	0	0	0
North Dakota	5	8	0	0	0	0	0	0	0	0	0
South Dakota	6	14	0	0	0	0	0	0	0	0	0
Nebraska	8	7	0	0	0	0	0	0	0	0	0
Kansas	55	102	0	0	0	0	1	0	0	0	0
SO ATL.											
Delaware	0	5	0	0	0	0	0	0	0	0	0
Maryland [2]	45	72	0	0	0	1	1	0	0	0	0
Dist of Col	26	9	0	0	0	0	0	0	0	0	0
Virginia	74	98	0	0	0	27	0	0	0	1	0
West Virginia	41	46	0	0	0	0	0	0	0	0	0
North Carolina	100	340	0	0	0	0	0	0	0	0	0
South Carolina	80	123	0	0	0	0	0	0	0	0	1
Georgia	33	83	0	2	14	0	0	0	0	4	12
Florida	40	18	0	1	0	0	0	0	0	0	3
E SO CEN.											
Kentucky	76	102	0	0	0	0	0	0	0	0	0
Tennessee	34	59	0	0	0	0	0	0	0	1	0
Alabama	22	36	0	0	0	0	0	0	0	0	0
Mississippi [2]	0	0	0	0	0	0	0	0	0	1	0
W SO CEN.											
Arkansas	19	11	0	0	6	0	0	0	0	0	0
Louisiana	10	2	0	0	3	0	0	0	0	2	3
Oklahoma	9	21	0	0	0	0	1	0	0	0	0
Texas	217	233	0	6	45	0	0	0	0	0	11
MOUNTAIN											
Montana	6	28	0	0	1	0	0	0	0	0	0
Idaho	19	19	0	0	0	0	0	0	0	0	0
Wyoming	3	0	0	0	0	0	0	0	0	0	0
Colorado	55	57	0	0	0	0	0	0	0	0	0
New Mexico	59	16	0	0	0	0	0	0	0	0	0
Arizona	20	20	0	0	0	10	0	0	0	0	0
Utah [2]	69	92	0	0	0	0	0	0	0	0	0
Nevada	8	2	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	89	84	0	0	0	0	0	0	0	0	0
Oregon	37	7	0	0	0	0	0	0	0	0	0
California	277	463	0	2	4	0	0	0	0	0	0
Total	3,916	4,555	1	15	78	38	5	0	0	10	31
10 weeks	40,078	43,492									

[1] New York City only
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended Feb. 28, 1942

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	1	0	9	2	2	0	1	0	7	0	0	1
Baltimore, Md	1	0	2	0	259	4	15	0	24	0	0	35
Barre, Vt	0	0	------	0	0	0	0	0	0	0	0	3
Billings, Mont	0	0	------	0	1	0	1	0	0	0	0	0
Birmingham, Ala	0	0	25	0	3	0	8	0	5	0	0	3
Boise, Idaho	0	0	------	0	3	0	2	0	0	0	0	0
Boston, Mass	0	0	------	0	64	1	16	0	71	0	1	24
Bridgeport, Conn	0	0	1	0	6	0	3	0	2	0	0	0
Brunswick, Ga	0	0	------	0	16	0	0	0	0	0	0	0
Buffalo, N Y	0	0	------	1	6	0	9	0	18	0	0	17
Camden, N J	0	0	2	1	7	0	3	0	13	0	0	2
Charleston, S C	0	0	64	0	0	1	0	0	1	------	0	0
Chicago, Ill	8	0	10	1	124	1	29	0	119	0	0	68
Cincinnati, Ohio	2	0	------	1	0	0	7	0	20	0	0	8
Cleveland, Ohio	0	0	12	2	5	1	8	0	72	0	0	17
Columbus, Ohio	0	0	3	3	16	0	5	0	2	0	0	7
Concord, N H	0	0	------	1	0	0	1	0	1	0	0	0
Cumberland, Md	0	0	------	0	1	0	0	0	4	0	0	0
Dallas, Tex	3	0	3	3	177	0	9	0	8	0	1	2
Denver, Colo	0	0	24	0	107	1	7	0	12	0	0	17
Detroit, Mich	3	0	2	1	83	0	16	0	157	0	0	72
Duluth, Minn	0	0	------	0	1	0	1	0	7	0	0	2
Fall River, Mass	0	0	------	0	0	1	1	0	32	0	0	0
Fargo, N Dak	0	0	------	0	0	0	0	0	0	0	0	0
Flint, Mich	0	0	------	0	1	0	4	0	2	0	0	2
Fort Wayne, Ind	0	0	------	0	0	0	2	0	1	0	0	0
Frederick Md	0	0	------	0	1	0	0	0	0	0	0	0
Galveston, Tex	0	0	------	0	0	0	2	0	1	0	0	0
Grand Rapids, Mich	0	0	------	0	4	0	0	0	2	0	0	4
Great Falls, Mont	0	0	------	0	76	0	1	0	0	0	0	2
Hartford, Conn	0	0	------	0	14	2	1	0	3	0	0	4
Helena, Mont	0	0	------	0	1	0	0	0	1	0	0	5
Houston, Tex	2	0	------	0	39	0	6	0	4	0	0	3
Indianapolis, Ind	0	0	------	0	12	0	7	0	27	0	0	13
Kansas City, Mo	0	0	1	1	5	0	6	0	43	0	0	0
Kenosha, Wis	0	0	------	0	3	0	0	0	4	0	0	9
Little Rock, Ark	0	0	5	0	103	1	0	0	0	0	0	0
Los Angeles, Calif	2	0	27	2	346	0	15	1	22	0	0	35
Lynchburg, Va	0	0	------	0	1	0	1	0	0	0	0	1
Memphis, Tenn	0	0	19	4	3	0	4	0	6	0	0	14
Milwaukee, Wis	0	0	1	1	27	0	9	0	30	0	0	67
Minneapolis, Minn	1	0	------	1	67	0	2	0	27	0	0	14
Missoula, Mont	0	0	------	0	0	0	1	0	0	0	0	0
Mobile, Ala	0	0	------	1	10	0	2	0	3	0	0	0
Nashville, Tenn	0	0	------	1	4	0	8	0	0	0	0	3
Newark, N. J	0	0	4	0	42	0	8	0	21	0	0	23
New Haven, Conn	0	0	------	0	125	0	1	0	2	0	0	4
New Orleans, La	1	0	------	0	19	1	6	1	5	0	1	1
New York, N. Y	25	2	13	0	46	6	81	1	234	0	2	185
Omaha, Nebr	1	0	------	0	62	0	1	0	3	0	0	0
Philadelphia, Pa	4	0	4	5	20	0	34	0	262	0	1	53
Pittsburgh, Pa	1	0	------	0	12	1	12	0	15	0	3	5
Portland, Maine	0	0	------	1	1	0	2	0	2	0	0	3
Providence, R. I	1	0	1	1	80	17	5	0	1	0	0	42
Pueblo, Colo	0	0	------	0	30	0	1	0	2	0	0	0
Racine, Wis	0	0	------	0	1	0	0	0	5	0	0	21
Reading, Pa	0	0	------	0	4	0	1	0	0	0	0	2
Richmond, Va	3	0	------	0	0	1	6	0	2	0	0	0

City reports for week ended Feb. 28, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va	0	0		0	0	0	2	0	0	0	0	0
Rochester, N Y	0	0		0	5	0	3	0	7	0	1	5
Sacramento Calif	0	0	4	0	83	0	3	0	2	0	0	6
Saint Joseph, Mo	0	0		0	1	0	8	0	1	0	0	0
Saint Louis, Mo	0	0		1	133	0	6	0	32	0	0	6
Saint Paul, Minn	0	0		0	525	0	2	0	5	0	0	17
Salt Lake City, Utah	0	0		0	6	0	2	0	1	0	0	5
San Antonio Tex	1	0	1	0	5	0	14	0	5	0	0	2
San Francisco, Calif	0	0	8	0	84	1	4	0	6	0	0	4
Savannah, Ga	0	0	23	1	47	0	2	0	0	0	0	1
Seattle, Wash	0	0		1	0	0	3	0	3	0	0	22
South Bend, Ind	1	0		0	2	0	0	0	30	0	0	0
Spokane, Wash	0	0		0	7	0	3	0	3	0	0	15
Springfield, Ill	0	0		0	92	1	6	0	1	0	0	1
Springfield, Mass	3	0		0	23	0	0	0	14	0	0	16
Superior, Wis	0	0		0	0	0	0	0	3	0	0	3
Syracuse, N Y	0	0		1	11	0	2	0	7	0	0	46
Tacoma, Wash	0	0		0	0	0	2	0	0	0	0	1
Tampa, Fla	0	0		0	5	0	0	0	0	0	1	2
Terre Haute, Ind	0	0		3	3	0	2	0	1	0	0	0
Topeka, Kans	0	0		0	2	0	2	0	3	0	0	8
Trenton, N J	0	0		0	4	0	5	0	8	0	0	11
Washington, D C	0	0	2	1	44	2	18	0	12	0	0	25
Wheeling, W Va	0	0		0	41	0	5	0	2	0	0	1
Wichita, Kans	0	0	1	0	15	0	2	0	5	0	0	2
Wilmington, Del	5	0		0	0	0	4	0	6	0	0	0
Wilmington, N C	0	0		0	239	0	3	0	0	0	0	0
Winston-Salem, N C	1	0		0	158	0	2	0	0	0	1	0
Worcester, Mass	0	0		0	9	0	8	0	7	0	0	25

Anthrax—Cases Philadelphia, 1
Dysentery, amebic Cases Baltimore, 1, New York, 4
Dysentery bacillary—Cases Dallas, 1, Los Angeles, 1, New York, 4, Syracuse, 1
Typhus fever—Cases Houston, 1, Savannah, 1, Tampa, 1

Rates (annual basis) per 100,000 population for the group of 87 cities in the preceding table (estimated population, 1942, 33,870,168)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
Week ended Feb 28, 1942	10 78	42 03	6 16	551 75	74 51	226 15	0 00	1 85	156 57
Average for week, 1937-41	18 64	158 15	20 51	983 37	123 97	264 56	4 51	3 26	175 24

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended February 14, 1942.—During the week ended February 14, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		7	1	3	4	2		1	3	21
Chickenpox		2		197	297	92	6	29	142	765
Diphtheria	2	34		22	2	6			10	76
Dysentery				70						70
German measles	2	1		35	41	29	17	18	42	185
Influenza		12			14	14			64	104
Measles				453	185	238	12	14	94	996
Mumps		21		348	298	137	75	40	434	1,353
Pneumonia		3			14	2			18	37
Poliomyelitis			2			1				3
Scarlet fever	2	19	13	138	252	37	35	74	43	613
Trachoma									1	1
Tuberculosis	2	2	8	88	39		28			167
Typhoid and paratyphoid fever				5				1		6
Undulant fever						1				1
Whooping cough		23		140	74				22	259
Other communicable diseases		2		1	244	39	6	5	10	307

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

Plague

Brazil.—Plague has been reported in Brazil, by States, as follows: November 1–30, 1941, Alagoas, 3 cases; Bahia, 2 cases, 1 death; Pernambuco, 16 cases, 9 deaths. December 1–31, 1941, Alagoas, 6 cases, 1 death; Pernambuco, 8 cases, 6 deaths.

Typhus Fever

Algeria.—Under date of January 29, 1942, typhus fever was reported to have spread in Algeria with great rapidity. Outbreaks are reported to have occurred in numerous localities, especially among the native

population, which is stated to lack sufficient food and proper sanitation. The numbers of cases have recently trebled in the Departments of Algeria and Oran, while in the Department of Constantine they have increased sixfold. From January 1 to 20, 1942, a total of 2,146 cases was reported, as compared with 65 cases for the corresponding period of 1941.

Various precautionary measures have been undertaken, such as disinfestation, head shaving of natives in public schools, and restrictions on travel in public conveyances. Compulsory preventive inoculation of the natives has not yet been undertaken but is under serious consideration. It is reported that the serum inoculations so far given have shown good results.

The following figures present a comparison of the incidence of typhus fever in Algeria during the period October 1-December 31, 1940, and 1941, and for the first 20 days of 1942 and 1941:

	1940	1941	1942
October 1-December 31	359	3, 070	-----
January 1-20	---	65	2, 146

France (unoccupied zone).—During the week ended February 28, 1942, 2 cases of typhus fever (including 1 imported case) were reported in the unoccupied zone of France. During the preceding week 2 imported cases of typhus fever were reported in the same locality.

Guatemala.—During the month of February 1942. 14 cases of typhus fever with 4 deaths were reported in Guatemala.

Morocco.—During the week ended February 21, 1942, 793 cases of typhus fever were reported in Morocco.

Peru.—During the period October 1 to December 31, 1941, cases of typhus fever were reported in Peru, by Departments, as follows: Amazonas, 62; Ancash, 11; Apurimac, 13; Arequipa, 26; Ayacucho, 12; Cajamarca, 1; Cuzco, 122; Huancavelica, 3; Huanuco, 4; Junin, 29; Libertad, 1; Lima, 4; Puno, 67; Tacna, 1.

Spain.—Recent reports reveal an increase in the incidence of typhus fever in Spain.[1] In the 4 weeks December 28, 1941, to January 24, 1942, inclusive, a total of 638 cases, with 64 deaths, was reported, as compared with 227 cases and 33 deaths for the preceding 4-week period. The current official figures are stated to be incomplete. The largest numbers of cases are reported to be occurring in the Provinces of Madrid, Cadiz, and Cordoba. It was estimated that there were 600 cases in Madrid on February 12, 1942. On February 9, 1942, it was reported that the disease had broken out in the political prisoners' jail in Barcelona, with approximately 100 cases present and a mortality of 14 percent.

[1] See PUBLIC HEALTH REPORTS for March 13, p. 407.

Tunisia.—During the week ended February 7, 1942, 416 cases of typhus fever (32 in Tunis) were reported in Tunisia. For the week ended January 31, 1942, 472 cases of typhus fever (58 in Tunis) were reported in Tunisia.

Yellow Fever

Brazil.—Yellow fever has been reported in Brazil as follows: Acre Territory, Sena Madureira, November 7, 1941, 1 death. Bahia State, Japu, December 21, 1941, 1 death.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E R COFFEY, *Assistant Surgeon General Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world, (2) articles relating to the cause, prevention, and control of disease, (3) other pertinent information regarding sanitation and the conservation of the public health

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IMMUNIZATION WITH INACTIVE VIRUS OF INFLUENZA B: COMPARISON OF ANTIBODY RESPONSE WITH THAT PRODUCED BY INFECTION[1]

By MONROE D. EATON, M. D., WALTER P. MARTIN, M. D., and the Personnel of Naval Laboratory Research Unit No. 1[2]

Immunization of human beings with formalinized preparations of the virus of influenza A has been tried extensively. Earlier experiments were inconclusive or negative (*1–3*), but more recent studies (*4–6*) have indicated partial protection against infection amounting to a reduction of incidence by about one-half. The discovery of strains of virus (influenza B) not antigenically related to the type A virus (*9, 10*) made necessary the development of a vaccine against influenza B. Experiments on immunization with a formalinized allantoic fluid culture of this virus were therefore undertaken. The effectiveness of the vaccine cannot be adequately determined until an epidemic of influenza B occurs among the groups inoculated, but some indication of its antigenicity may be obtained from a comparison of the antibody response of vaccinated individuals with the antibody response resulting from infection of another group during an epidemic of influenza B.

MATERIALS AND METHODS

Preparation of vaccine.—Allantoic fluid passages done by the method of Nigg, Crowley, and Wilson (7) and amniotic fluid passages by the procedure of Burnet and Lush (8) were started from the

[1] From the Research Laboratory of the California State Department of Public Health and Naval Laboratory Research Unit No 1, Berkeley, Calif Received for publication January 8, 1942

The studies and observations on which this paper is based were supported in part by the International Health Division of The Rockefeller Foundation The opinions advanced in the paper are those of the writers and do not represent the official views of the Navy Department

[2] The Unit personnel consists of Commander A P Krueger, Lieutenants (junior grade) W P Chesbro, L R Rosenberg, and N S West, Ensigns A S Browne, O J Golub, and J R Mathews; Chief Pharmacist Mates I L Shechmeister and T P Sislock, Pharmacist Mate (first class) W L Axelrod; Pharmacist Mates (second class) E R Chisholm and G B Saviers; Pharmacist Mate (third class) O. R. Webb, Jr; and Hospital Apprentice (first class) H R Burkhead

The authors also gratefully acknowledge the assistance of Dr J C. Talbot, Miss M D. Beck, and Mr. Howard Bodily of the California State Department of Public Health

eighty-fourth mouse-lung passage of the virus of influenza B, strain Lee. Most of the vaccine was made from the allantoic fluid and chorio-allantoic membranes of embryos inoculated into the allantoic sac with a 1:10 dilution of infected amniotic or allantoic fluid. A small lot of vaccine was also prepared from the amniotic fluid of embryos inoculated in the amnion; but there was no evidence that this was superior to the preparations from the allantoic fluid and membranes, and the yield was smaller. Embryos 9 to 11 days old were inoculated. After 48 to 72 hours' incubation the eggs were opened, the allantoic and amniotic fluids withdrawn, and the membranes and embryos separated. Pools of fluids, chorio-allantoic membranes, and embryos from 6 to 12 eggs were titrated separately by intranasal inoculation of mice. Fluids or 10 percent suspensions of membranes which killed half of the number of mice with typical lung lesions at a dilution of 1:1,000 to 1:10,000 were saved for vaccine. Lots with lower titers were discarded. In the minced embryos from which the heads and feet had been removed, the virus titered 1:100 or less. Consequently, the embryos were not used for the preparation of vaccine.

Each lot of vaccine was tested for bacterial contamination by the usual methods and for possible neurotropic viral contaminants by intracerebral inoculation of mice. A small proportion of the mice inoculated intracerebrally died after 6 to 7 days with symptoms suggesting encephalitis. The brains of these mice showed marked congestion. This might have been due either to a neurotropic property of the Lee strain itself or to some other virus introduced during the course of the intranasal mouse passages. The egg-adapted virus was specifically neutralized by sera from persons convalescent from influenza B. Preliminary experiments indicated that there was no specific neutralization of the agent which produced neurological signs in mice after intracerebral inoculation.

Because of the foregoing observations it was considered inadvisable to use the active influenza B virus for inoculation of human volunteers. The virus was inactivated by adding 0.14 to 0.20 percent of formaldehyde. All lots of vaccine were then stored in the liquid state at 4° C. for 10 to 20 days until a few minutes before use. Tests for viral activity were done by intranasal and intracerebral inoculation of mice. Mice inoculated intraperitoneally with 0.5 cc. of undiluted preparation and tested 2 weeks later by intranasal inoculation were protected against the production of lung lesions by 1,000 M.L.D. of the Lee strain.

Combined vaccination against influenza A and B.—Human volunteers mostly 20 to 30 years of age were inoculated subcutaneously into the left arm with 1 cc. of the influenza B vaccine. At the same time 1 cc.

of the complex influenza A-distemper vaccine [3] of Horsfall and Lennette (*11*) was inoculated into the right arm of each person. The circumstances under which this work was done made it necessary to use both vaccines at once. Blood specimens were collected from a representative group of those vaccinated before and 2 weeks after vaccination.

Neutralization tests.—Varying 4-fold dilutions of serum inactivated at 56° C. for 30 minutes were mixed with constant amounts of virus in mouse lung suspensions of the strain Lee. The dilution of mouse lung was 1 to 2 percent, representing about 10 to 20 M.L.D. The serum virus mixtures were incubated for 30 minutes at 37° C., and each dilution of serum plus virus was then inoculated intranasally into 3 Swiss mice. The lung lesions in mice dying and in those surviving for 10 days were recorded. The end point was taken as the highest even dilution of serum which protected mice against death and prevented the consolidation of more than 50 percent of the lung tissue (*12*). Titers were stated in terms of the reciprocal of the original dilution of serum before the addition of an equal part of virus suspension.

NEUTRALIZING ANTIBODIES OF THE VACCINATED GROUP COMPARED WITH CASES OF INFLUENZA B

Degree of increase.—The neutralizing antibody titers of acute and convalescent serum specimens taken about 2 weeks apart from a group of 70 influenza patients who were studied during an epidemic of influenza B in the winter of 1940 (*13*) were compared with pre- and postvaccination serum specimens from 63 persons receiving the influenza B vaccine. The vaccinated and infected groups were comparable in age but could not in other respects be considered as strictly identical samples of the population.

From the results shown in table 1 it is evident that more of the influenza patients showed large increases in antibodies than did persons in the vaccinated group. Further analysis of the data indicates that this effect was related to the differences in initial antibody titers of the vaccinated and infected groups. Seventy-two percent of the influenza patients had antibody titers of 2 or less at the time of onset, while only 16 percent of the vaccinated group had comparably low titers before vaccination. In these groups with low initial titers, the mean increase resulting from infection was 17 times while that resulting from subcutaneous inoculation of formalinized virus was 22 times. In the smaller group of cases with initial titers of 4 to 8, the mean increase in antibodies was only 3.4 times while that of the comparable vaccinated group was 5.5 times. The least increase in

[3] This vaccine was supplied by the New York laboratories of the International Health Division of The Rockefeller Foundation.

antibodies occurred in the vaccinated group with initial titers of 16 or over which comprised 41 percent of the total.

TABLE 1.—*Increase in neutralizing antibodies following vaccination with inactive virus of influenza B compared with infection*

Group and number tested	Initial titers	Percent of total	Number showing increase after 14 to 28 days of—					Mean of antibody increase [1]
			0	Twice	4 to 8 times	16 to 32 times	Over 32 times	
Influenza cases (70)	0-2	72	5	8	14	19	10	17.0
	4-8	22	7	5	3	1	0	3.4
	16-32	6	2	1	0	0	0	----------
Vaccinated (63)	0-2	16	1	0	2	5	2	22.0
	4-8	43	3	7	15	2	0	5.5
	16-32	41	10	8	8	0	0	----------

[1] Geometric mean of the ratios of prevaccination to postvaccination titers or preinfection to postinfection titers. Does not include those showing no increase in titer.

There is at present no evidence that infection with influenza virus fails to elicit an antibody response in some persons, but this possibility should be kept in mind, especially when cases with high initial antibody titers are considered. Because of this uncertainty, the data for sera showing no increase in antibodies in the infected and vaccinated groups alike were not included in the calculation of the mean increase in antibodies. Only 4 persons with initial titers between 0 and 8 failed to develop more antibodies after vaccination.

Antibody levels 2 weeks after infection or vaccination.—In figure 1 the distribution of antibody levels of 54 convalescent sera is compared with

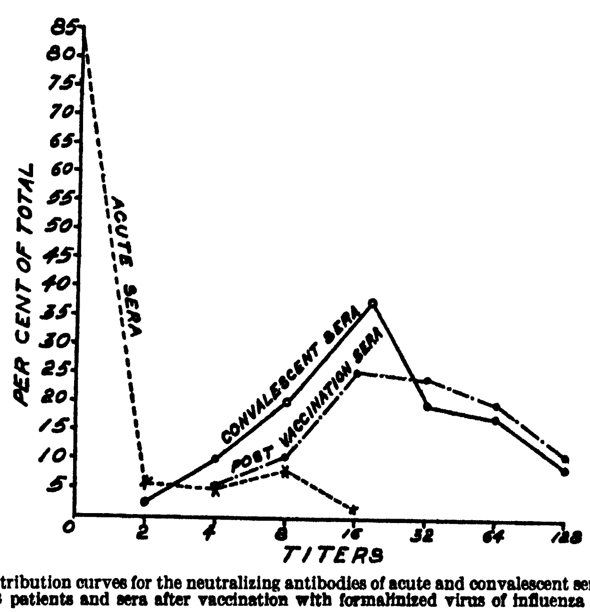

FIGURE 1.—Distribution curves for the neutralizing antibodies of acute and convalescent sera from influenza B patients and sera after vaccination with formalinized virus of influenza B.

postvaccination levels in 63 sera. It is apparent that the curve for the cases which showed an increase in antibodies is similar in location and form to the curve for the vaccinated group which includes individuals both with and without an increase in antibodies. The dotted line showing the titers in 54 acute-phase serum specimens is included for comparison. Roughly 90 percent of the sera from influenza convalescents and from vaccinated persons had a titer of 8 or above, while only 10 percent of the acute-phase sera showed this level of antibodies.

The results presented in table 1 and figure 1 indicate that, as far as circulating antibodies are concerned, the response resulting from vaccination with formalinized influenza B virus, prepared as described, is similar to that resulting from infection.

RESPONSE OF COMPLEMENT-FIXING ANTIBODIES

The results presented in table 2 indicate that the increase in complement-fixing antibodies after vaccination with the inactive influenza B virus was less definite than the response to infection. This is in contrast to the results with neutralization (compare table 1). In the infected group the mean increase in complement-fixing antibodies exceeded the mean increase in neutralizing antibodies. In the vaccinated group, on the other hand, the mean increase in complement-fixing antibodies was less than the mean increase in neutralizing antibodies. Discrepancies between complement fixation and neutralization tests are indicated by the footnotes to table 2. Failure to detect an increase in complement-fixing antibodies in pairs of sera showing an increase in neutralizing antibodies may have been due in part to the lack of a sufficiently sensitive type B antigen. In some of the vaccinated individuals the increase in complement fixation titers may have been exaggerated by a slightly increased reactivity of the post-vaccination specimens with normal mouse lung.

TABLE 2.—*Increase in complement-fixing antibodies following vaccination with inactive virus of influenza B compared with infection*

Group and number tested	Initial titers	Percent of total	Number showing increase after 14 to 28 days of—					Mean of antibody increase
			0	Twice	4 to 8 times	16 to 32 times	Over 32 times	
Influenza cases (45)	0-2	71	[1]6	1	1	16	8	31.0
	4-8	27	2	1	7	2	0	6.7
	16-32	2	0	1	0	0	0	---------
Vaccinated (43) -----	0-2	14	0	0	4	2	0	10.0
	4-8	56	1	[3]13	8	2	0	2.8
	16-32	30	[2]6	[3]7	0	0	0	---------

[1] 4 of these cases showed an increase in neutralizing antibodies.
[2] 4 out of 6 persons in this group showed an increase in neutralizing antibodies.
[3] 2 persons in these groups showed no detectable increase in neutralizing antibodies.

COMPARISON OF NEUTRALIZING ANTIBODY RESPONSE TO INFLUENZA A AND B FOLLOWING COMBINED VACCINATION

In the course of these studies the question arose as to whether or not human beings receiving influenza A and B viruses in two separate inactive formalinized preparations responded with the production of antibodies in equal degree to both Many of the sera studied had high initial neutralizing antibody titers either to the type A or to the type B influenza virus Consequently the increases in these cases were not comparable because of the difference in initial levels.

The pre- and postvaccination antibody titers against influenza A and B in a group having similar titers to both viruses before vaccination are summarized in table 3 It is obvious that some individuals showed a marked increase to influenza A, but little or none to influenza B, while the reverse was true in other cases Less than half of the group showed any indication of equivalent response to both antigens

TABLE 3—*Comparison of neutralizing antibody responses to influenza A and B after combined vaccination of individuals having similar initial antibody titers for both viruses*

Initials	Titer influenza A		Titer influenza B	
	Prevaccination	Postvaccination	Prevaccination	Postvaccination
N B	4	4	4	32
V I S	4	96	0	0
R T	4	96	8	8
B C G	8	16	8	64
V C D	8	32	8	32
H R L	8	96	8	16
H P	8	16	8	16
J L D	16	64	8	32
F R F	16	64	16	64
M F N	32	128	16	16
J C D	32	96	32	32
J D G	64	128	16	32

SUMMARY AND CONCLUSIONS

When the degree of antibody increase following vaccination and infection with the virus of influenza B is considered, the two groups, infected and vaccinated, are not strictly comparable because the initial antibody titers tend to be higher in the vaccinated group However, it appears that the subcutaneous injection of inactive virus raises the titers of neutralizing antibodies to a level similar to that following infection The less definite response of complement-fixing antibodies in the vaccinated group indicates that the antigenic stimulus produced by the inactive virus was not identical with that of infection

Because of the present uncertainty as to the role of circulating antibodies in immunity to viruses, claims for effectiveness of any

vaccine should not be based on considerations of antibody response. The results just reported indicate that formalinized allantoic fluid preparations of the virus of influenza B have a relatively high antigenicity as judged by the production of neutralizing antibodies.

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OBSERVATIONS ON EXPERIMENTAL MALARIA CONTROL DRAINAGE DITCH LININGS [1]

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INTRODUCTION

"Building malaria out" is a term in common usage among malaria control workers The term may be defined as precluding the creation of anopheline (malaria-transmitting) mosquito breeding places by the inclusion of antimosquito breeding provisions in the design, construction, and maintenance of engineering works which involve both natural

[1] From the Division of Infectious Diseases, National Institute of Health

and artificial bodies of water. This principle frequently is applied in the case of water impoundages, highways, railroads, flood control works, and other projects wherein "man-made" mosquito-breeding places could result. The practice is followed when the inverts of drainage ditches are lined with impervious materials and otherwise stabilized to promote durability. The stabilization of such ditches is a more permanent, a more positive, and generally a less expensive method of mosquito control than recurrent cleaning, grading, and larvicidal operations.

Lined ditches are not advocated to the exclusion of all other types of drainage. In many instances open earth ditches are entirely adequate and frequently only funds for their cheaper initial construction can be provided. On the basis of their long life, efficiency, and their generally lower total cost, i. e., construction and maintenance, lined ditches should be the choice where the finances of the community will allow (fig. 1).

Ditch lining is important in the field of malaria control as is evidenced by the extent of its use. (See fig. 2.)

The Public Health Service, through the Office of Malaria Investigations, has conducted studies of concrete and brick ditch linings. These studies were initiated on a small scale, during the latter part of 1930, in the city of Memphis and in Shelby County, Tennessee. They were intensified from 1936 through 1938. These studies have served as an important impetus to the practice of ditch stabilization by malaria control engineers in the United States.

The chief purpose of the investigations was to develop ditch linings which could be constructed at minimum cost, without sacrifice of durability. Leanest concrete mixes and thinnest slab sections permissible as well as simplicity in construction methods were among the principal objectives of the studies.

The removal of residual water within the time limit of the incubation period of mosquitoes is of extreme importance in the control of mosquito production. From this standpoint, the lined ditches have functioned satisfactorily with a negligible requirement of repair. Repair purposely has been withheld in order that the ditches might be subjected to conditions equivalent to those most demanding in the field. The experimentally lined ditches have been in service for periods varying from 2 to 10 years, and their durability appears to be that expected from concrete and brick materials. Their general condition to date leaves little to be desired from the standpoints of stability, durability, and residual water removing efficiency.

Monolithic concrete linings, linings of brick, and of precast concrete slabs were considered in the studies. Observations on these experimental projects are presented.

FIGURE 1 —Before and after installation of durable malaria control drainage. (Photographs by courtesy of Nelson H. Rector, Mississippi State Board of Health

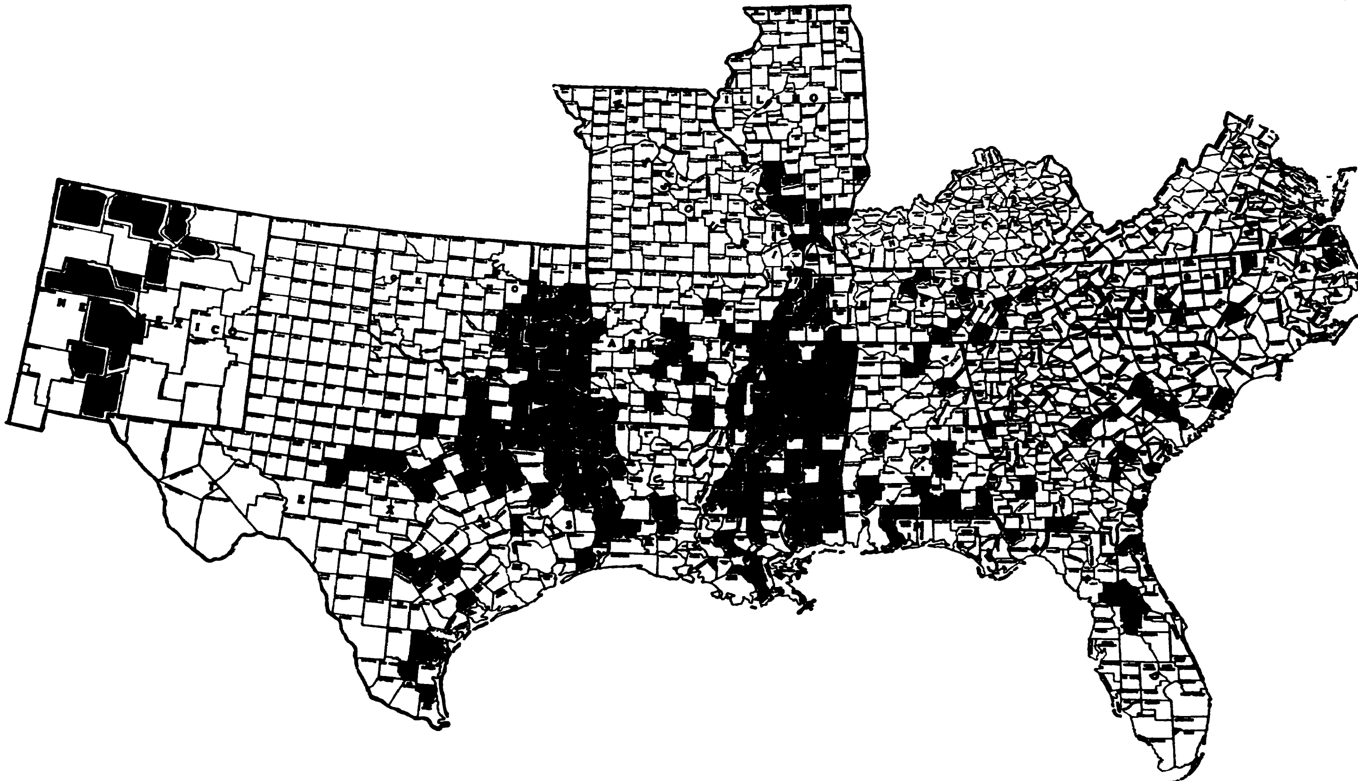

FIGURE 2.—Counties in which durable malaria control drainage projects were being carried on as of December 31, 1940

PRELIMINARY CONSIDERATION

For the most part, the ditches selected for study were typical "field ditches" 3 to 4 feet deep. Effort was concentrated on search for linings suitable for small ditches as encountered in suburban, small town, village, and heavily populated rural situations, since here lies the greatest present need for an inexpensive, easily constructed ditch lining.

The experimental linings constructed in the inverts of the ditches vary from 24 to 90 inches in width and average about 30 inches. In most cases ditch banks were sloped 1½ to 1. Grades generally are under 1 percent. Topography of the area is gently sloping. For the period of record, temperature and precipitation reported for the area (*1*) was as follows:

Temperature = average 61.9° F.
absolute lowest −9° F.
absolute highest 106° F.
Precipitation = average for year 48.15 in.
greatest in 24 hrs. 10.48 in.
Freezes and thaws over past 4 years [1] = 146

Soil in the area is classified as Memphis silt loam (*2*). Vegetation cover, for the most part, consists of cultivated fields and pasture lands with an occasional small growth of hard woods.

The linings were designed to cover the ditch bottoms and extend up the banks a few inches above the observed erosion line. These factors were determined by inspection in the field. Following installation of the linings the ditch banks were "blanket sodded" with Bermuda grass sod, in most instances.

Cross section of a typical lining installation in a ditch three feet deep, with banks sloping 1½ to 1, is shaped like the arc of a circle, having a radius of 1.25 feet; the chord measures 2 feet, the arc 2.5 feet, and the depth or rise of chord 6 inches.

Inspections of the lined ditches have been made at periods following decided seasonal changes, most often during the spring and fall, and also following times of heavy rainfall.

PLAIN MONOLITHIC CONCRETE LININGS

After rough excavation, grade stakes were set above the established grade line a distance corresponding to the thickness of the lining, and final or finish grading was then done. These stakes were set at 5- or 10-foot intervals on the center line of the ditch. A nail was set in each stake to guide the measurements in locating the edges of the lining. Wooden forms were then set in place. (See fig. 3.) The

[1] Period during which majority of linings were in place.

type of form chosen depended on the thickness of the lining to be placed. If a 2-inch slab was to be cast, S4S two by fours 12 feet long were used; these sizes varied with the thickness of the proposed lining. Three-quarter inch holes were bored on the center line of the forms, 6 inches from each end and in the middle of each form. Tapered pins of either wrought iron or wood, about 6 inches long, were driven through the holes into the earth to secure the forms in place. No nails were used in placing the forms. Forms for 100 feet of lining were set at one operation. A cross-section form for a 1-inch expansion joint was set at each end of the 100-foot sections. One-half the chord of the arc of the cross section of the lining was established. This figure was used in locating the position of the forms, by hand rule, with relation to the nails in the center-line grade stakes. With all material at hand, 16 minutes was the average time required for two men to set forms for 100 linear feet of ditch lining. Before the concrete was placed the ground was "wetted down" by sprinkling to prevent the absorption of water from the freshly cast concrete slab.

A 3½ cubic foot batch concrete mixer was used on all projects. Mixer runs were timed 1 full minute or more. All materials necessary for 200 linear feet of lining were placed at 200-foot intervals along the ditch bank. The mixer was located on the bank, with room enough between the mixer and the ditch for man and wheelbarrow to pass. For the most economical operation, it was found that three men were sufficient. One man measured and fed the material into the mixer. This man also operated the mixer. A second man wheeled the concrete from the mixer to location. A third man used shovel, float, straight edge, and template to place the concrete in the form.

A straight edge reaching from grade stake to grade stake was used in finishing to assure a uniform flow line. A cross-section template was used to obtain uniformity in cross section.

In most instances header walls (key or curtain walls) 2 inches thick and 12 inches deep were constructed at the upstream ends of slabs. Arrangements for this wall were completed before any concrete was poured. Weep holes 1 inch in diameter were placed in the bottom of the invert lining at 10-foot intervals by means of plugs set through the fresh concrete.

Forms were removed immediately following pouring and shaping. The concrete was cured by covering with 2 inches of wet earth and allowing the earth to remain for 10 days except in cases where curing intentionally was omitted for study purposes.

Forms were kept well covered with a coat of heavy oil.

Data on materials used and other pertinent information are as follows:

Cement.—Standard grade Portland cement (made in U. S. A.).
Water.—Memphis city water.

Water-cement ratio.—6 to 7 gallons of water per sack of cement.
Character of concrete.—"Moist, stiff and workable".
Cement and aggregate mixes.—1:2:4 to 1:3:6 and 1:4:5.
Range of ratio of fine aggregate to coarse aggregate:
Using ⅜ in. coarse aggregate—0.33 to 0.44.
Using ¾ in. coarse aggregate—0.33 to 0.44.

Graduation of aggregates:	Percent
Sand, passing ⅜-inch sieve	100.0
Sand, passing No. 4 sieve	100.0
Sand, passing No. 16 sieve	82.8
Sand, passing No. 50 sieve	5.4
Sand, passing No. 100 sieve	.7
¾ inch coarse, passing 1-inch sieve	100.0
¾ inch coarse, passing ¾-inch sieve	100.0
¾ inch coarse, passing ½-inch sieve	90.6
¾ inch coarse, passing ¼-inch sieve	39.0
¾ inch coarse, passing No. 4 sieve	15.6
⅜ inch coarse, passing ⅜-inch sieve	100 0
⅜ inch coarse, passing ¼-inch sieve	75.0
⅜ inch coarse, passing No. 4 sieve	40.6
⅜ inch coarse, passing No. 8 sieve	33.6

Organic impurities in aggregate=light straw color in sodium hydroxide test.
Fine material in aggregate=7/32-inch deposit of silt in jar test.

The cost of plain monolithic concrete lining as shown in table 1 is based on the following unit costs (these unit costs also apply to all other linings described herein):

Item:	Unit cost [3]
Unskilled labor	30¢ per hour.
Cement	75¢ per sack.
Sand	$1.40 per cubic yard.
Gravel	$1.40 per cubic yard.
Water	Free.
Sod	Free.
Forms (material and labor) negligible.	

Labor charges for form assembly, and for concrete mixing, pouring, floating, finishing, and curing, all are included under "labor." Charges for engineering services, supervision, and labor for rough excavation and finish grading are not included.

One case of failure due to compression has been observed in the plain monolithic concrete linings. In this instance a transverse crack had occurred at the end of a section where no provision had been made for an expansion joint between the two sections (fig. 4), indicating that ample provision for expansion joints should be made between individual sections. Small amounts of vegetation have been observed growing in weep holes and uncaulked expansion joints. However, only in rare instances was this sufficient to cause any appreciable retardation of flow and deposition of silt. Objectionable

[3] These prices f. o. b. job.

vegetation growth possibly might be eliminated by caulking the joints or by overlapping the slab ends as is discussed under "precast slabs." Transverse cracks, longitudinal cracks, and holes in concrete have been noted in thin monolithic slabs (fig. 5).

TABLE 1.—*Cost of plain monolithic concrete ditch lining* [1]

Size of gravel, inches	Thickness, inches	Mix	Cost per square foot		
			Labor	Material	Total
3/8	½	1:3:6	$0 0065	$0.0078	$0.0143
3/8	¾	1:2:4	.0063	.0160	.0223
3/8	1	1:2:4	.0094	.0244	.0338
3/8	1	1:2.5:4	.0061	0188	.0249
3/8	1	1:4:5	.0078	.0187	.0265
3/8	1¼	1:2.5:4	.0064	.0218	.0282
3/8	1¼	1:3:6	.0097	.0207	.0304
3/8	1¼	1:4:5	.0084	.0214	.0298
3/8	1½	1:2 5:5	.0084	.0286	.0370
3/8	1½	1·3 5	.0061	0282	.0343
3/8	1½	1:3 5·5	.0077	0269	0346
3/8	1½	1.3:6	0078	.0279	.0357
3/8	2	1:1 5·3	.0228	.0481	.0709
3/8	2	1 2 4	0160	0375	0535
3/8	2	1·2 5 5	0166	0331	.0497
3/8	2	1 3.5	0032	.0276	.0308
3/8	2	1 3·6	.0138	0338	.0476
5/8	1½	1·3:5	0092	0220	.0312
5/8	1½	1 3 6	0112	.0245	0357
5/8	2	1 2.4	0111	0327	.0438
5/8	2	1:2 5 5	0110	0254	0364
5/8	2	1:3.6	0091	.0302	0393
5/8	2½	1·3:5	0091	0425	.0516
5/8	2½	1 3 5 5	0046	.0369	.0415
5/8	2½	1 4·5	0058	.0364	0422
Graded	1½	1 3 5	0071	0236	.0307
Do	1½	1·3·6	.0060	0213	0273
Do	2	1.3 4	0070	0334	0404
Do	2	1 3·4 5	0070	0320	0390
Do	2	1 3 5	0070	0311	0381
Do	2	1:3 5 5	0067	0322	0389
Do	2	1 3 5 5	0073	0316	0389
Do	2	1 3 6	0070	.0293	0363
Do	2	1 3¼ 6	0074	0316	0390
Do	2	1·4·5	0077	0300	0377
None	½	1 4½	0054	0088	.0142

[1] Average of linings installed under conditions listed

An analysis of the data available shows a correlation between the slab thickness and the frequency of occurrence of these defects. It may be noted in table 2 that the frequency of each of these phenomena increases with decreasing thicknesses of slab cross section. For practical purposes it appears that a slab thickness of 2 to 2½ inches is the minimum which should be employed.

TABLE 2.—*Frequency of transverse and longitudinal cracking and disintegration in monolithic slabs*

Thickness, inches	Months of service	Transverse cracks per 100 linear feet			Percent of lining with longitudinal cracks	Percent of sections with holes
		Average	Range	Median		
1	39-45	13 5	10-17		75 0	100
1	40-45	7 3	2-13		9.0	9
1¼	34-42	6 5	0-16	7	1 9	4
2	22-45	5 5	1-9	6	1.9	4
2½	36-40	2.1	0-4	2	0.0	0

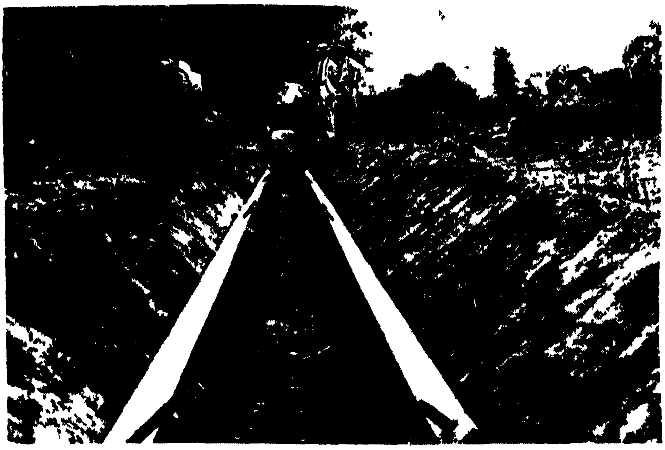

FIGURE 3.—Ditch prepared for lining. Note forms and center-line stakes in place.

FIGURE 4.—Crack at extreme left (arrow) caused by compression resulting from lack of expansion joint between the two sections. Dark line along ends of slabs (center) is not an opening but a shadow cast by slab on right which has "overlapped" slab on left.

FIGURE 5.—Transverse and longitudinal cracking and holes in monolithic concrete slabs

It should be stated that none of these defects have exhibited any harmful effect upon the residual water-carrying function of the linings. However, longitudinal cracks and holes, if left unrepaired, might exert a harmful effect on the linings themselves by rendering them vulnerable to undermining.

There are indications that transverse cracking may increase with increasing age of the concrete, perhaps at a decreasing rate, as the lining is subjected to more wetting, drying, freezing, and thawing (as has been the experience with concrete highways) (*3*). For example, there was a noticeable increase in the number of transverse cracks during the winter of 1939–40, a winter which was extremely severe in the Memphis area. In some instances there is evidence of flaking or chipping at the transverse cracks (see fig. 6).

It was considered desirable to control the position and direction of transverse cracking as these cracks, when formed at an angle, later developed into a Y or "crow foot" (the small piece of slab between the forks of the Y may become dislodged and lead to undermining of the lining (fig. 7)). Control of cracking was attempted by constructing dummy or false transverse joints by means of an edging tool, at right angles to the line of flow. The depth of these false joints was half the thickness of the lining. Observations to date indicate that control of cracking can be accomplished by this means (fig. 8). It may be seen in table 3 that dummy joints 3 feet apart prevent cracking. While no dummy joints have been installed at distances of 5 or 7.5 feet apart, some such greater distance might suffice.

TABLE 3.—*Cracks in plain monolithic concrete linings (2 inches thick) provided with dummy transverse joints (controlled cracks at dummy joints not included)*

Distance between joints (feet)	Months service	Transverse cracks per 100 linear feet
33	46	[1] 4
10 to 18	45	[1] 1
10	45	[1] 2
3	43	0

[1] Present in fall of 1939, no additional cracks during severe winter of 1939–40

As stated before, determination of leanest concrete mixes permissible was one of the objectives of the studies. Mixes from 1:2:4 up to 1:3:6 and 1:4:5 with water ratios from 6 to 7 gallons of water per sack of cement were used. In an attempt to evaluate the effect of these factors on the durability of concrete linings it has been considered desirable to include a consideration of some other factors, viz, proportioning of aggregates, plasticity, and curing. All these factors are interrelated and exert an influence on the durability of concrete separately and in combination. Attempt has been made to determine

whether there is any significance in conditions of abrasion, cracking, absorption, and strength of the concrete in the various projects.

A visual inspection reveals no evidence of detrimental wear from abrasion in any of the linings. In this connection it should be stated that there is remarkably little abrasive material carried by the ditches comprising these studies. This is especially true when provisions have been made for the introduction of surface water, along the course of the ditches, over grass-sodded aprons or concrete aprons to prevent bank scouring.

There was but a slight significant difference in transverse cracking when considered by varying mixes and by curing or absence of curing. It was noted that slightly fewer transverse cracks occurred in the "richer" concrete mixes and, as pointed out previously, fewer transverse cracks occurred in the thicker slabs.

Through the cooperation of the Portland Cement Association tests on absorption and compressive strength were conducted on a limited number of samples. All samples submitted for test were 2 inches thick and had been cured by covering with 2 inches of wet earth for 10 days. The absorption tests on samples taken from linings in service 38 to 49 months were uniformly low, ranging from 3.6 to 5.1 percent absorption by weight after 24 hours in water. These figures are well within those set for good concrete.

Samples submitted for test for compressive strength consisted of right-angle parallelopipeds, approximately 6 by 6 inches by lining thickness, broken from the linings. Except from the 1:2:4 mix sample, 2-inch test cubes could not be cut from the samples by sawing with the equipment available. The samples were described as "very open popcorn-like composition." It was reported that "the test specimens would shatter on sawing and when the saw would strike the coarse pebbles in the mixture, they would fly out, causing the concrete to break up." The cube from the one sample tested gave a compressive strength of 5,510 pounds per square inch compression, which when converted to 6- by 12-inch cylinder would equal 4,794 pounds per square inch. (Mix=1:2:4; water-cement ratio=7 gallons; cured 2 inches wet earth, 10 days; ⅝-inch gravel; in service 51 months.) With reference to the quality of the test specimens it was suggested that there may have been (*a*) insufficient compaction, (*b*) too low a sand-gravel ratio, (*c*) a need for proportioning and grading of the fine and coarse aggregates so as to secure a more dense, homogeneous mass, or (*d*) a harsh working concrete. In this connection the method of curing also should be examined.

These possibilities may be explained by the following considerations: (*a*) Lack of compaction may have occurred, as suggested by the description of the fresh concrete as being "moist-stiff-workable." While such concrete may have been workable, its consistency, "moist,"

and plasticity, "stiff," may still have left something to be desired. (*b*) The sand-gravel ratio was somewhat below that generally recommended, viz, 0.33 to 0.44 vs. 0.55 to 0.77 for ⅜-inch coarse aggregate and 0.33 to 0.44 vs. 0.40 to 0.60 for ¾-inch coarse aggregate. (*c*) Lack of homogeneity may have occurred, as an examination of the sieve tests on the aggregates (previously given) showed, at best, a questionable graduation. (*d*) Harshness of mix may have resulted from the use of the high-aggregate mixes. (*e*) It is suggested that curing concrete with wet earth is at best a questionable practice; unless water is readily available in the field the degree of wetness of the earth is debatable. These factors, in combination with the possible use of sun-dried aggregates, present a hazard to the water content of freshly cast concrete. Incidentally, in well-cured concrete there is less volume change and consequently less early shrinkage with resultant cracking. Water tightness and wear resistance are likewise enhanced.

It should be noted that these linings have been in service from a minimum of 38 months to a maximum of 51 months during which time they have been subjected to severe weather conditions. Up to the present time no unusual failures have occurred; the effects of future frost action remains to be seen. Header (key or curtain) walls were placed in some instances. As has been stated, grades encountered are under 1 percent and it is possible that this may account for the fact that no failures were observed which could be assigned to a difference in construction, i. e., with or without header walls.

Weep holes at 10-foot intervals were employed to relieve hydrostatic pressure. In some instances grade stakes were left in place flush with the slab surface. This was done to determine whether it might be possible to use these openings in lieu of weep holes. It has been observed in some instances that hydrostatic pressure, ground movement of plastic soil, or freezing and thawing action have forced these stakes upward several inches (fig. 9). This suggests that a more desirable practice would be to provide weep holes at the time of construction or that the grade stakes should be driven through for some distance following setting of the concrete.

Flash run-off following heavy rains on some occasions subjected newly installed monolithic linings and freshly blanket-sodded banks to intense scouring action. Even under these destructive conditions the linings remained intact and in place, as may be seen in figure 10. Only repair to the freshly sodded banks was necessary.

REINFORCED MONOLITHIC CONCRETE

Effort was made to determine any significant differences between the durability of plain and lightly reinforced concrete linings. Lin-

ings were installed reinforced with No. 19 wire poultry netting, 2-inch mesh, and 12½-gauge 4-point barb wire.

Operations were essentially the same as those described under the method of construction of plain monolithic linings. Light reinforcement appears to offer but slight advantage over plain monolithic construction. The same types of failures have been observed; however, with reference to transverse cracking there appears to be slight advantage in favor of the reinforced concrete. That this advantage is sufficient to warrant the additional cost for material and labor is open to question.

TABLE 4.—*Comparison between transverse cracking of plain and reinforced monolithic concrete ditch lining*

Thickness, inches	Months of service		Transverse cracks per 100 linear feet	
	Plain	Reinforced	Plain	Reinforced
1	39-45	42	13.5	7
1	40-45	40	7 3	4
1½	34-42	42-45	6.5	7
2	22-45	45	5.5	3 2

TABLE 5.—*Cost of reinforced monolithic concrete ditch lining* [1]

Type of reinforcing	Size of gravel, inches	Thickness, inches	Mix	Cost per square foot		
				Labor	Material	Total
Poultry wire	⅜	¾	1.3 6	$0 0073	$0 0193	$0 0266
Do	⅜	1	1.2.3 5	0067	.0187	.0254
Do	⅜	2	1.1 5 3	.0238	0484	0722
Do	⅜	2	1.2 5 4	.0186	.0433	.0619
Do	⅜	2	1.2.5·5	0163	.0396	0559
Do	None	½	1·6	.0063	0160	.0223
Barb wire	⅜	1½	1.2 4	.0116	0277	0393
Do	⅜	1½	1 3 6	.0079	0271	0350
Do	⅜	2	1 1 5 3	.0207	.0486	.0693
Do	⅜	2	1 2.4	0112	.0395	.0507
Do	⅜	2	1 3 6	0153	.0365	0518
Barb wire and poultry wire	⅜	2	1 2 4	.0209	.0423	0632

[1] Average of linings installed under conditions listed.

PRECAST CONCRETE SLAB LININGS

Several types of precast concrete slab ditch linings were cast and installed. These sections, for the most part, were cast in small units for one-man handling. They varied in shape and method of tying-in or together. Some [4] were fastened by wires threaded transversely through the sections (*4*); others depended upon locking arrangements and weight for stability. The various types included slabs with butt joints, interlocking joints, tongue and groove joints, and overlapping joints (*5*).

[4] The Shelby County, Tennessee, Health Department cooperated in this work.

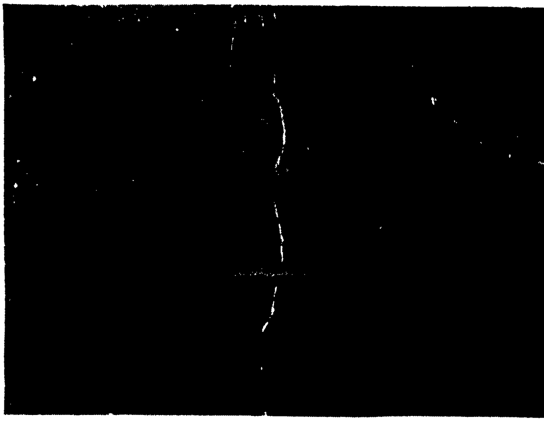

FIGURE 6.—Flaking of concrete at transverse crack.

FIGURE 7.—Y or crowfoot crack.

FIGURE 8.—Dummy or false transverse joint.

FIGURE 9 —Grade stake pushed above lining by frost action, a distance of 3 inches

FIGURE 10 —Newly installed monolithic lining intact after being subjected to intense scouring run-off. Note destruction of freshly sodded ditchbanks

Methods of manufacture of all these slabs were practically the same. Sets of homemade wooden forms and a hand-mixed stiff dry-mix concrete were used. A crew of two men was employed. One man measured the ingredients and mixed the concrete; the other assembled and tamped concrete in the forms. A wetter mix was used for the flat side-slabs than for the curved invert-pieces. The latter were cast in "bottom-side-up" or convex position. Following tamping, the side form-pieces were carefully removed and the section allowed to remain on the supporting form. When casting overlapping joint third round sections, the above procedures were modified in an attempt to lower costs by reducing labor required for tamping. In this case forms were constructed to cast these sections in "right-side-up" or concave position; at the same time wetness of the mix was increased. However, no great reduction in costs resulted as the labor required to place a wet mix in position or tamp a dry one by these methods was almost the same.

All slabs were cured by covering with wet bagging and kept damp by hand sprinkling for a period of 7 days. Costs of these sections are shown in table 6.

TABLE 6.—*Cost of precast slab concrete ditch lining* [1]

Type	Thickness, inches	Mix	Casting per square foot		Placing per square foot, labor [2]	Total cost per square foot
			Labor	Material		
T & G Interlocking	2	1 3 1	$0.0207	$0.0332	$0.0017	$0.0557
T & G Interlocking	2	1 4 2	.0239	.0274	.0027	.0540
Third round	2	1 4 4	.0384	.0408	(3)	[4] .0792
Interlocking	2	1 3 2	.0435	.0374	(3)	[4] .0809
Interlocking	2	1 4 4	.0480	.0363	(3)	[4] .0843
Interlocking	2	1 3 2	.0413	.0387	(3)	[4] .0800

[1] Average of linings installed under conditions listed in headings
[2] Haulage, a factor variable with distance, not included in placing charge.
[3] Not yet placed
[4] Not placed

Precast slab concrete linings installed have functioned with a minimum of failures. Some breakage of slabs was experienced during handling attendant to installation; however, these sections were installed and grouted in place. One disadvantage is that vegetation grows between the joints of butt joint slabs (figs. 11 and 12).

Comparable growths have not been observed in the joints of precast slabs held together by tongue and groove, interlocking, or overlapping joints. While it is true that the experimental linings of these latter types are installed in situations generally less favorable to vegetation growth, indications are that objectionable growth would not have occurred to any great extent.

BRICK

The method employed for the installation of brick and brickbat linings consisted in stretching a cord along the ditch center line from grade stake to grade stake, set at 5-, 10-, or 25-foot centers. Bricks were laid parallel to the center line and spaced about ⅜-inch apart. A well-mixed dry mortar, 1:3 to 1:4, was broomed into the space between the bricks. Water was then applied with a hand sprinkler until brick and mortar were water-satisfied. The cost of brick lining is given in table 7.

TABLE 7.—*Cost brick ditch lining* [1]

Mortar mix	Method placing	Cost per square foot		
		Material [2]	Labor	Total
1:3	Dry	$0.0079	$0.0097	$0.0176
1:3.25	do	.0039	.0056	.0095
1:3.5	do	.0088	.0115	.0203
1:4	do	.0074	.0089	.0163
1:4.5	do	.0133	.0083	.0216
1:3	Wet	.0391	.0079	.0470
1:4	do	.0034	.0117	.0201
1:4.5	do	.0140	.0081	.0221
1:6	do	.0122	.0073	.0195

[1] Average of linings installed under conditions listed.
[2] Material, cement and sand. Brick obtained without cost.

One of the most important failures observed in the construction of brick linings is failure to secure initial bond. This can be caused by insufficient spacing between the brick and consequently a lack of mortar to furnish bonding. This failure can be prevented if good workmanship is observed. The face of the bricks themselves may be dirty or covered with small vegetable growths which prevent the mortar from adhering and bonding to the brick surface. This failure can be overcome by assuring that the surfaces of the bricks are clean. Lack of initial bond leads to later loosening of brick and to possible washouts of the lining.

In some instances, growth of vegetation through a mortar of 1:4 has occurred in sufficient amount to retard flow and permit silting. Vegetation growth has not been observed through mortar mixes of 1:3.

That only hard durable brick should be used is demonstrated by the disintegration of soft or "salmon" brick, with subsequent formation of holes in the lining. Soft brick should not be incorporated in the lining (fig. 13).

Brick linings are vulnerable to hydrostatic pressure unless sufficient weep holes are provided. This is demonstrated by one instance of almost complete failure of an entire brick lining subjected to hydrostatic pressure which was not adequately provided with weep holes.

Care should be exercised to obtain firm compaction of back-filling when brick linings are to be installed. Subsequent settling of the

FIGURE 11 —Heavy vegetation growth between the joints of butt joint precast slabs

FIGURE 12 —Young willow growing between the joints of butt joint precast slabs

FIGURE 13.—Disintegration of soft or "salmon" brick.

FIGURE 14.—Well-bonded brick broken away from the mother lining. Break was due to settling of backfill.

back-fills has caused sections of well-bonded brick to break away and become separated from the mother lining. This has occurred mainly along the edges of the lining (fig. 14).

SODDING

In most cases the ditch banks above the linings were blanket-sodded with Bermuda grass sod. Sod squares 12 x 12 inches were secured to the ditch banks by means of wooden pegs to prevent their washing away by scouring action of water from rains occurring before the sod had time to take root and establish itself. Sod squares of this size can be easily handled. Cost of sodding is shown in table 8.

TABLE 8.—*Cost sodding ditch banks* [1]

Type	Cutting per square foot	Placing per square foot	Total per square foot
Strip	$0 0039	$0 0025	$0 0054
Blanket	.0024	.0022	.0046

[1] Average of all sod installed on projects Haulage, a factor variable with distance, not included.

The value of the stabilization of ditch banks cannot be overemphasized. It is considered that a large part of the efficiency of the experimentally lined ditches can be assigned to the stabilization of the banks by means of vegetation. This subject is of such importance that it warrants exhaustive investigation.

Naturally a study such as has been described emphasizes imperfections; however, it should be pointed out that the poorest of the ditch linings are rendering acceptable service and apparently will continue to do so for a considerable period of time.

Some small amount of experimental work was done with bituminous materials, but no satisfactory method was worked out. Additional research is needed in this direction.

REFERENCES

(*1*) Brist: Annual Meteorological Summary, 1939, Memphis, Tennessee. Weather Bureau, U. S. Department of Agriculture

(*2*) Bennett, Allen, Davis, and Watkins: Soil Survey of Shelby County, Tennessee (1916). Bureau of Soils, U. S. Department of Agriculture.

(*3*) What old concrete roads tell us; Highway planning and design series, No. 4, Portland Cement Association.

(*4*) Precast concrete units for ditch linings; No. C P 40, Concrete Information, Portland Cement Association.

(*5*) Elmendorf and Lee: Concrete invert and tile manufacture by the Malaria Division of the Escambia County Health Department, Pensacola, Florida. Supplement to the Symposium on Malaria appearing in the July and August, 1939, issues of the Southern Medical Journal.

DEATHS DURING WEEK ENDED MARCH 14, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Mar. 14, 1942	Corresponding week, 1941
Data from 86 large cities of the United States:		
Total deaths	9,361	8,988
Average for 3 prior years	9,093	
Total deaths, first 10 weeks of year	91,852	95,433
Deaths per 1,000 population, first 10 weeks of year, annual rate	13.0	13.5
Deaths under 1 year of age	544	513
Average for 3 prior years	496	
Deaths under 1 year of age, first 10 weeks of year	5,625	5,369
Data from industrial insurance companies:		
Policies in force	64,963,934	64,649,882
Number of death claims	13,506	12,836
Death claims per 1,000 policies in force, annual rate	10.8	10.4
Death claims per 1,000 policies, first 10 weeks of year, annual rate	10 2	11.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED MARCH 21, 1942

Summary

Meningococcus meningitis is the only one of the important communicable diseases for which the current incidence is above that for the corresponding week of each year since 1937. A total of 91 cases was reported, as compared with 88 last week and a 5-year (1937–41) median of 54 cases. For the corresponding week in 1937, however, a total of 215 cases was reported. During the current week, New York reported 22 cases, Texas 10, Maryland 9, and Connecticut, New Jersey, Illinois, and Virginia 5 each. A total of 752 cases has been reported to date this year, as compared with 537 last year and a 5-year cumulative median of 587.

The number of cases of poliomyelitis dropped from 18 to 16. The 5-year median for the week is 22. Influenza declined (4,508 cases as compared with 5,101 last week and 5-year median of 7,037), while measles increased slightly. The current and cumulative figures to date for measles are both above the 5-year median. The current incidence, however, is only about 50 percent of that for the corresponding week last year.

The incidence of smallpox increased from 16 to 40 cases (14 in Texas, 10 in Missouri), slightly above last year's record low for the the week (36 cases).

Other reports for the week include 2 cases of anthrax in Pennsylvania, 11 cases of amebic dysentery (5 in Texas), 70 cases of bacillary dysentery (42 in Texas, 11 in Georgia), 34 cases of unspecified dysentery (19 in Arizona, 14 in Virginia), 63 cases of typhoid fever (below the incidence for the corresponding week in any prior year), 13 cases of tularemia, and 35 cases of endemic typhus fever.

The crude death rate for the current week for 88 large cities in the United States is 12.4 per 1,000 population, as compared with 13.2 for the preceding week and 12.7 for the 3-year (1939–41) average.

Telegraphic morbidity reports from State health officers for the week ended March 21, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Mar. 21, 1942	Mar. 22, 1941		Mar. 21, 1942	Mar. 22, 1941		Mar. 21, 1942	Mar. 22, 1941		Mar. 21, 1942	Mar. 22, 1941	
NEW ENG.												
Maine	1	0	0	3	-----	4	173	118	118	4	0	0
New Hampshire	0	0	0	----	3	------	10	89	50	0	0	0
Vermont	0	0	0	----	------	------	15	13	13	0	0	0
Massachusetts	1	1	3	----	------	------	820	700	700	3	4	2
Rhode Island	1	0	0	1	------	------	171	2	9	0	0	0
Connecticut	0	0	4	2	6	7	413	94	94	5	0	0
MID ATL.												
New York	26	19	28	[1]11	[1]32	[1]32	683	7,892	1,408	22	3	3
New Jersey	4	10	10	16	29	19	443	2,772	1,401	5	2	1
Pennsylvania	18	21	34	-----	-----	----	1,087	5,149	322	2	4	5
E. NO. CEN.												
Ohio	7	6	20	22	68	14	196	7,691	252	1	1	1
Indiana	7	26	12	57	38	57	125	1,156	60	0	5	3
Illinois	20	17	23	41	53	53	645	4,159	104	5	1	2
Michigan [2]	7	1	8	4	19	3	246	3,275	289	1	0	0
Wisconsin	2	0	1	38	184	184	871	1,058	1,058	0	0	1
W. NO. CEN.												
Minnesota	3	0	2	5	3	2	947	12	62	1	0	0
Iowa	1	3	3	4	161	9	402	198	147	0	0	0
Missouri	2	9	9	1	201	201	325	384	22	0	3	1
North Dakota	1	0	2	------	8	62	64	27	27	0	0	0
South Dakota	3	0	0	----	1	2	4	3	2	0	0	0
Nebraska	4	2	2	11	11	4	304	9	15	0	0	0
Kansas	3	3	3	9	5	22	415	1,012	537	1	1	0
SO. ATL.												
Delaware	1	0	0	----	------	------	8	392	32	0	0	0
Maryland [2]	10	8	8	5	32	32	890	196	196	9	1	1
Dist. of Col.	0	2	7	5	2	2	83	287	39	1	1	1
Virginia	10	2	20	382	583	501	290	1,896	376	5	0	2
West Virginia	2	8	8	257	49	218	148	552	20	0	1	2
North Carolina	10	15	13	28	73	73	1,362	1,085	1,085	2	1	1
South Carolina	1	1	5	505	666	666	257	293	41	0	0	0
Georgia	4	8	8	119	226	226	450	396	205	0	2	2
Florida	3	5	8	20	149	10	185	1,066	178	2	1	1
E. SO. CEN.												
Kentucky	5	3	7	6	90	90	91	1,111	137	2	3	5
Tennessee	6	2	8	71	267	267	140	337	165	2	3	5
Alabama	7	6	6	440	551	551	349	731	190	0	1	7
Mississippi [2]	12	3	4	------	------	------	------	------	------	1	1	1
W. SO. CEN.												
Arkansas	5	6	6	226	247	211	235	240	39	0	0	0
Louisiana	7	3	12	3	7	14	188	120	21	1	3	2
Oklahoma	11	5	6	213	250	250	376	55	55	0	1	1
Texas	50	40	35	1,228	2,568	1,677	2,363	1,250	476	10	1	1
MOUNTAIN												
Montana	3	2	2	33	2	4	[3]87	9	18	0	0	0
Idaho	2	0	0	------	------	2	81	18	18	0	0	0
Wyoming	0	1	1	192	3	------	95	61	61	0	0	0
Colorado	8	5	9	74	18	18	247	266	253	0	0	0
New Mexico	2	1	1	5	15	15	66	143	70	0	1	1
Arizona	0	2	2	209	173	173	365	0	26	1	0	0
Utah [2]	0	1	1	5	22	15	155	13	105	0	1	0
Nevada	0	0	------	3	6	------	4	10	------	0	0	------
PACIFIC												
Washington	2	5	2	9	8	------	322	89	89	1	1	1
Oregon	4	3	3	28	26	51	167	545	45	2	0	0
California	17	16	25	217	152	181	5,148	473	473	2	5	3
Total	293	271	450	4,508	7,037	7,037	22,521	47,447	9,246	91	52	54
11 weeks	3,542	3,308	5,828	54,130	453,935	144,942	[3]158,613	263,427	136,721	752	567	587

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended March 21, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Mar. 21, 1942	Mar. 22, 1941		Mar. 21, 1942	Mar. 22, 1941		Mar. 21, 1942	Mar. 22, 1941		Mar. 21, 1942	Mar. 22, 1941	
NEW ENG.												
Maine	0	0	0	11	11	17	0	0	0	0	0	0
New Hampshire	0	0	0	12	2	2	0	0	0	0	1	0
Vermont	0	0	0	11	7	7	0	0	0	0	1	0
Massachusetts	1	1	0	330	153	169	0	0	0	1	0	0
Rhode Island	0	0	0	8	9	11	0	0	0	0	1	0
Connecticut	1	0	0	44	81	91	0	0	0	0	0	0
MID. ATL.												
New York	0	0	0	548	553	1,017	0	0	0	3	1	3
New Jersey	0	0	0	197	381	239	0	0	0	0	0	1
Pennsylvania	0	0	0	572	371	436	0	0	0	8	5	5
E. NO. CEN.												
Ohio	0	0	1	374	319	317	0	1	5	2	3	3
Indiana	2	0	1	153	186	196	0	0	6	0	3	1
Illinois	1	0	0	269	520	601	2	7	10	1	1	4
Michigan [2]	0	0	0	259	155	442	2	2	2	1	2	4
Wisconsin	1	0	0	191	144	172	0	1	4	0	0	1
W. NO. CEN.												
Minnesota	0	1	0	113	47	105	2	3	9	0	0	0
Iowa	0	0	0	47	69	157	0	4	23	1	1	1
Missouri	1	0	0	76	228	228	10	6	8	1	2	2
North Dakota	1	3	0	32	3	28	0	2	3	0	0	0
South Dakota	0	1	0	39	24	18	0	0	4	0	0	0
Nebraska	1	0	0	50	27	27	1	0	8	0	0	0
Kansas	0	0	0	125	55	130	1	0	5	0	1	1
SO. ATL.												
Delaware	0	0	0	51	14	14	0	0	0	0	0	0
Maryland [3]	0	0	0	85	55	47	0	0	0	1	0	1
Dist. of Col.	0	0	0	16	23	20	0	0	0	0	1	7
Virginia	0	0	1	28	43	40	0	0	0	2	3	3
West Virginia	1	0	0	41	42	46	0	0	0	2	3	3
North Carolina	0	0	0	45	25	40	0	0	1	1	0	1
South Carolina	0	0	0	5	8	4	0	1	0	0	3	1
Georgia	0	0	0	20	15	15	0	0	0	4	3	3
Florida	0	6	0	4	8	10	0	0	0	3	6	3
E. SO. CEN.												
Kentucky	0	2	0	135	133	100	0	0	0	5	1	4
Tennessee	0	0	0	75	105	59	2	1	0	2	1	2
Alabama	1	1	0	29	16	14	2	1	0	1	2	2
Mississippi [2]	0	0	0	29	2	3	0	0	0	1	2	2
W. SO. CEN.												
Arkansas	0	0	0	6	6	10	4	0	2	2	3	3
Louisiana	2	0	0	4	8	11	0	0	2	3	0	4
Oklahoma	0	2	1	21	30	27	0	0	14	1	5	1
Texas	0	1	1	50	59	71	14	0	6	4	8	14
MOUNTAIN												
Montana	0	3	0	23	22	22	0	0	2	0	0	0
Idaho	1	0	0	6	5	21	0	1	2	0	0	0
Wyoming	0	0	0	27	9	9	0	1	0	0	1	0
Colorado	0	0	0	42	46	51	0	0	4	0	6	1
New Mexico	0	0	0	2	6	22	0	0	0	0	4	2
Arizona	0	0	0	6	5	7	0	0	0	1	1	1
Utah [2]	0	0	0	32	22	29	0	0	0	0	0	0
Nevada	0	0	------	0	0	------	0	0	------	0	0	----
PACIFIC												
Washington	0	0	0	37	34	46	0	5	6	2	3	2
Oregon	0	1	1	10	6	39	0	0	18	3	1	1
California	2	2	2	136	177	236	0	0	18	7	3	3
Total	16	24	22	4,426	4,269	5,029	40	36	327	63	82	101
11 weeks	266	274	238	44,084	40,114	58,995	271	880	3,297	842	827	1,213

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended March 21, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Whooping cough, Week ended Mar. 21, 1942	Whooping cough, Week ended Mar. 22, 1941	Week ended Mar. 21, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	16	36	0	0	0	0	0	0	0	0	0
New Hampshire	6	3									
Vermont	43	5	0	0	0	0	2	0	0	0	0
Massachusetts	269	189	0	0	0	0	0	0	0	0	0
Rhode Island	38	14	0	0	0	0	0	0	0	0	0
Connecticut	86	59	0	0	1	0	0	0	0	0	0
MID. ATL.											
New York	527	294	0	2	9	0	0	0	0	0	0
New Jersey	268	93	0	1	0	0	0	0	0	0	0
Pennsylvania	220	373	2	0	0	0	0	0	0	2	0
E. NO. CEN.											
Ohio	116	307	0	0	0	0	0	0	0	0	0
Indiana	45	37	0	0	0	0	0	0	0	0	0
Illinois	124	86	0	1	0	0	0	0	0	1	0
Michigan [1]	147	199	0	0	1	0	0	0	0	0	0
Wisconsin	182	101	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	25	74	0								0
Iowa	15	64	0								0
Missouri	9	90	0								0
North Dakota	1	17	0								0
South Dakota	2	10	0								0
Nebraska	7	32	0								0
Kansas	42	136	0								0
SO. ATL.											
Delaware	0	6	0								0
Maryland [2]	35	94	0	0	0	0	0	0	0	1	0
Dist. of Col.	15	7	0								0
Virginia	38	98	0	0	0	14	0	0	0	0	0
West Virginia	25	64	0								0
North Carolina	127	271	0	0	0	0	0	0	0	0	1
South Carolina	57	116	0	0	0	0	0	0	0	1	0
Georgia	32	18	0	1	11	0	0	0	0	4	8
Florida	37	15	0	0	0	0	0	0	0	0	5
E. SO. CEN.											
Kentucky	82	74	0								0
Tennessee	33	30	0	0	0	1	0	0	0	0	0
Alabama	23	37	0						0	1	3
Mississippi [2]			0						0	1	1
W. SO. CEN.											
Arkansas	10	20	0	0	0	0	0	0	0	0	0
Louisiana	19	13	0	1	0	0	1	1	0	1	3
Oklahoma	15	45	0	0	0	0	0	0	0	0	0
Texas	117	269	0	5	42	0	0	0	0	1	14
MOUNTAIN											
Montana	10	31	0	0	0	0	1	0	0	0	0
Idaho	2	9	0	0	0	0	0	0	0	0	0
Wyoming	10	0	0	0	0	0	0	0	0	0	0
Colorado	86	85	0	0	0	0	0	0	0	0	0
New Mexico	9	15	0	0	0	0	0	0	0	0	0
Arizona	81	42	0	0	0	19	0	0	0	0	0
Utah [2]	87	86	0	0	0	0	0	0	0	0	0
Nevada	3	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	115	93	0	0	0	0	0	0	0	0	0
Oregon	39	18	0	0	0	0	0	0	0	0	0
California	286	465	0	0	6	0	3	0	0	0	0
Total	3,531	4,240	2	11	70	34	7	1	0	13	35
11 weeks	43,609	47,732									

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Correction, week ended Mar. 7, 1942. Montana, 90 cases.

CONSOLIDATED MONTHLY STATE MORBIDITY REPORTS FOR OCTOBER, NOVEMBER, AND DECEMBER, 1941

	Actino-mycosis	Chick-enpox	Diph-theria	Dysen-tery, amebic	Dysen-tery, bacil-lary	Dysen-tery, unde-fined	En-cepha-litis, infec-tious	Ger-man measles	Hook-worm disease	Influ-enza	Malaria	Measles	Menin-gitis, menin-gococ-cus	Mumps	Oph-thalmia neona-torum	Pellagra	Pneu-monia, all forms	Polio-myeli-tis
NEW ENG.																		
Maine		677	1				1	351		2	1	1,796	4	834	1		107	18
New Hampshire		109	4					1		3		77		92			4	16
Vermont		416	16					20				23		321			3	8
Massachusetts	3	3,345	44		105		6	162				1,508	36	2,487	82	5	[1] 593	62
Rhode Island		192	48		1			12		1	1	398		107			58	11
Connecticut	1	1,304	4	1	73		1	47		21	4	624	10	886			456	35
MID. ATL.																		
New York		4,910	144	22	406		22	329			23	2,237	45		26		4,880	435
New Jersey		3,402	66	6	6		5	191		123	3	359	13	861	19		875	109
Pennsylvania		6,274	157	6	19		12				2	5,041	47	3,367			1,159	198
E. NO. CEN.																		
Ohio		5,642	237	2	30		3	50		134	6	555	8	712	35		867	130
Indiana		675	195	1	1		1	7		331	11	165	8	62			181	27
Illinois	2	3,254	324	23	75		14	114		133	35	460	20	1,673	9	5	2,709	132
Michigan	2	5,583	108	13	119		4	645		14	8	722	14				858	85
Wisconsin		6,274	20	2			9			263		1,542	11	4,857			156	44
W. NO. CEN.																		
Minnesota	5	2,262	33	10	4		19		1	21		495	4				213	92
Iowa	1	782	46		1		13	8		24	2	459	4	609			353	13
Missouri		417	100			29				68	7	148	8	140		1	422	12
North Dakota	1	600	19				19	34		75		803	1	33			305	10
South Dakota		204	54				3			1		25	3	358			49	7
Nebraska		242	41				1	4		2		61		47			7	1
Kansas		2,325	55		3		13	23		140	7	831	8	972		1	412	16

[1] Lobar pneumonia only

CONSOLIDATED MONTHLY STATE MORBIDITY REPORTS FOR OCTOBER, NOVEMBER, AND DECEMBER, 1941—Con.

	Actino-mycosis	Chicken-pox	Diph-theria	Dysen-tery amebic	Dysen-tery bacil-lary	Dysen-tery unde-fined	En-cepha-litis infec-tious	Ger-man measles	Hook-worm disease	Influ-enza	Malaria	Measles	Menin-gitis, menin-gococ-cus	Mumps	Oph-thalmia neona-torum	Pellagra	Pneu-monia, all forms	Polio-myeli-tis
SO. ATL																		
Delaware	----	223	15	1					-	5	- -	20	- -	41	-----	1	5	16
Maryland	--- --	551	159	6	62	33	2	85	---	61	14	892	23	263	3	---	605	48
District of Columbia	----	157	19	1	1				- -	11		37	3	8	------	1	159	26
Virginia	------	547	443	1	1 448	- --			- --	2 188	26	979	11	92	--- ---	9	596	70
West Virginia	----	345	120		31	---	1			157	2	1 470	7	582	------	-----	38	18
North Carolina	----	1 084	978		1	- -		33		67	27	2, 445	10		-	7	32	42
South Carolina	----	100	801	5			7	73	390	3, 491	2 594	327	6	139	11	199	880	39
Georgia	---	156	382	8	32	8	9		1, 674	464	225	328	3	112	-	41	404	57
Florida	---	38	98	9	3	---	-	10	2, 230	148	37	110	7	96	3	3	225	30
E SO CEN																		
Kentucky		789	152		44	-----	2			41	3	486	18	177	- --	-----	186	46
Tennessee		371	247	8	70	-----		19	13	318	117	443	14	89	2	22	536	209
Alabama		193	391	2		- ---	4	5		655	1 634	325	8	137	3	55	455	140
Mississippi	---	903	207	383	1 392	-----		-	1, 456	13 361	6, 824	1, 724	10	1, 484	25	704	3, 427	29
W SO CEN																		
Arkansas	-	139	277	8	20	-		11	28	914	658	489	4	167	2	62	266	24
Louisiana	-	60	122	7	5	--- -	1		191	130	88	31	13	52	6	6	282	17
Oklahoma	-	160	203	5	54	- --	3		6	1 128	513	343	3	108	-	15	327	23
Texas	-	1, 194	897	64	594	-----	19	-		12, 651	1, 759	1, 488	15	1, 413	19	321	1, 626	43
MOUNTAIN																		
Montana		894	30	1	-	-----	2	25	-----	67	- ---	342	3	302	-------	-------	32	11
Idaho	--	248	13	-----		- ---		11	--- -	12	-----	87	- --	103	-------	-------	5	4
Wyoming	- -	335	15	---		- ---	2	4	------	68	-----	39	3	45	-------	-------	44	4
Colorado		453	159	- -	4	-	4		- ----	412	---	1, 289	1	94	-------	-------	250	7
New Mexico	----	170	16	5	21	-	1	43	------	18	7	201	2	153	-------	1	203	1
Arizona	-----	295	36	- ---	- -	306	6	145	------	1, 241	21	622	-------	456	2	40	332	4
Utah	-	2 327	2	- -	----	- -	1	132	-----	90	--- -	287	2	971	-------	-------	97	14
Nevada	-----	54	2	-------	--- ---	-----	-------	-------	-------	-------	-------	8	-------	125	-------	-------	86	-------

PACIFIC																		
Washington	--	2,637	9		5		4	150		65	2	109	4	2 430			116	28
Oregon		673	42	3			1			182	6	462	1	660		1	228	32
California	1	7,294	247	38	100		28	1 218		1 015	29	5 469	16	10 071	7		[1]794	65
Total	16	71 285	7,798	641	4 730	376	243	3 962	5 989	40 316	14 696	39 231	431	38 788	275	1 500	26 853	2 508
Fourth quarter 1940	13	78 491	5 601	603	2 598	388	141	1 458	6 105	178 440	13 638	48 035	347	23 923	141	1 706	31 301	3 219
Median, (4th qr) 1936-40		67 016	11 000				222		7 515	31 594	17 580	38 721	494	21 855	434	1 699	28 100	4 833
Total 1941	50	299 985	17 939	3 175	24 281	1 461	3 045	160 362	26 093	685 226	67 225	891 051	1 984	198 264	810	7 725	112 293	8 947
Total 1940	37	279 159	16 252	2 991	19,152	1 484	911	9 682	35 536	423 072	77 553	286 791	1 631	117 693	1 038	8 688	141 939	9 781
Median, 1936-1940		272 472	28 551				911		30 940	277 826	82 123	297 378	2,638	145 620	2 142	9 301	127 933	7 281
Alaska		152	8					124		224		20		157			38	
Hawaii Territory		56	29	6	13		2	11	4	46	1	287	1	25		-	[1]46	27

[1] Lobar pneumonia only

CONSOLIDATED MONTHLY STATE MORBIDITY REPORTS FOR OCTOBER, NOVEMBER, AND DECEMBER, 1941—Con.

	Puerperal septicemia	Rabies in animals	Rabies in man	Rocky Mountain spotted fever	Scarlet fever	Septic sore throat	Smallpox	Tetanus	Trachoma	Trichinosis	Tuberculosis, respiratory	Tuberculosis, all forms	Tularemia	Typhoid and paratyphoid fever	Typhus fever	Undulant fever	Vincent's infection	Whooping cough
NEW ENG.																		
Maine				0	169	1	0				85	97		12		5	13	297
New Hampshire				0	125	2	0					24		2		11		182
Vermont				0	54	1	0				14	35		1		11	7	226
Massachusetts		5		0	2,373	35	0	6	5	16	793	882	1	36		14		2,093
Rhode Island				0	115	11	0				84	503		4		2		592
Connecticut				0	262	25	0			2	338	352	2	9		29		695
MID. ATL.																		
New York		10		2	2,666	223	0	19		39	3,021	3,266	1	112	12	60	199	6,141
New Jersey		66		0	1,062	15	0	3	1	12		727	1	28	1	16		2,381
Pennsylvania	1			1	2,226		0		3			529	21	125	3	9		2,916
E. NO. CEN.																		
Ohio			1	1	2,529	13	3	1	2	1	1,116	1,189	189	123		37		2,607
Indiana				0	931		15		1		284	286	73	27		8	1	278
Illinois		97	1	4	2,062	36	2	14	30	2	2,164	2,367	59	49		48	44	2,799
Michigan		7		0	2,003	421	13	8		3		1,522	37	66	2	48	48	4,286
Wisconsin				0	1,510	19	5					255	19	16		37		3,484
W. NO. CEN.																		
Minnesota				0	749	17	8	3	2			494	2	2		39		711
Iowa		11		0	577	70	11				173	173	9	21		132		253
Missouri				0	687	10	18	1	229			521	16	53		4		236
North Dakota				1	128		3				64	67	2	4		1	18	135
South Dakota				0	279	5	2		12			54		7		1		90
Nebraska				0	217	3	1				5	46		15		2		48
Kansas		7		0	871	5	6	3			116	138	9	12		15	39	721
SO. ATL.																		
Delaware			1	0	193		0				41	41		7				38
Maryland				1	584	59	0	4			681	703	9	81		14	56	455
District of Columbia				0	186		0				376	385		10		2		225
Virginia				2	699	460	0	1	7		708	708	16	162	9	7		655
West Virginia				0	744	18	0					410	13	57		4		358
North Carolina				2	1,052	45	0				486	505	5	40	31	2	7	1,440
South Carolina		34		1	161	18	1	1				112		41	41			513
Georgia	1			0	459	127	3	4		1		387	10	59	395	31		222
Florida				0	73	1	0	4				250		23	45	4	15	15[illegible]

E. SO. CEN.																		
Kentucky				0	908	33	3				401	408	94	101		2		955
Tennessee	2			1	938	59	5	6	5	4		818	23	98	34	4	36	417
Alabama		43	1	0	552		1	9				578		33	115	19		186
Mississippi	75			0	288		5		11		298	303	3	20	25	2		1,711
W. SO. CEN.																		
Arkansas	4	72		2	116	143	8	2	122		216	231	19	82	8	3		183
Louisiana		4		0	96	7	2	8			275	275	7	90	87	23	1	41
Oklahoma				2	261	116	8	1	493			317	14	37		13	27	114
Texas		8		0	630		10		32			508	9	148	162	56		1,114
MOUNTAIN																		
Montana				1	318	21	1		6			54	1	7				324
Idaho				0	90		1				8	8		3		7	7	82
Wyoming				9	82	6	C		5			16	19	11		9		97
Colorado				0	274	7	2				253	253	3	32		6		595
New Mexico	3	26	1	0	95	6	1				223	228	1	27		1		235
Arizona				0	51	12	2		228			223		7		2		248
Utah				0	135	16	0				30	32	4	2		4		278
Nevada				0	15		0		1			17		2		1	1	100
PACIFIC																		
Washington		14		0	499	19	3		1		298	336	1	19		14	5	1,232
Oregon		4		0	99	8	3		6			163	1	10		5	36	351
California		143		0	1,553	17	3	21	49	20	2,267	2,379	3	74	13	96		2,583
Total	86	551	5	30	32,746	2,110	149	119	1,251	100	14,818	24,175	696	2,007	978	860	560	46,075
Fourth Quarter 1940	103	643	8	13	31,794	1,945	579	98	1,525	129	13,652	24,063	571	2,139	624	781	615	51,065
Median, (4th qr.) 1936–1940	103			14	42,187		1,369			66	12,891	24,053	571	3,184	603	781		38,393
Total 1941	315	2,494	25	505	128,518	10,345	1,368	426	5,426	464	63,664	106,372	1,482	8,485	2,780	3,408	1,939	221,590
Total 1940	427	2,761	31	417	155,707	10,198	2,764	412	4,489	521	57,245	103,348	1,641	9,658	1,879	3,358	2,167	183,273
Median 1936–1940	427			380	183,893		9,738			331	56,406	103,718	1,641	13,767	1,879	3,358		183,273
Alaska					4	11					116	126		2			2	46
Hawaii					4	1		5	1	2	198	212		33	31	5		134

Anthrax: Massachusetts, 3; New York, 5, New Jersey, 3, Pennsylvania, 15; North Carolina, 1; Florida, 1; Texas, 3; Oregon, 1.

Botulism. North Dakota, 3; New Mexico, 1; California, 11

Dengue: South Carolina, 10; Alabama, 2; Louisiana, 1; Texas, 342; Arizona, 6

Diarrhea· Ohio, 275 (under 2 years); Michigan, 3 (infant, diarrhea); Maryland, 123, South Carolina, 1655; New Mexico, 89, Nevada, 6 (infant, diarrhea); Washington, 22 (under 2 years, 20); California, 21 (infant, epidemic).

Food poisoning Ohio, 13; Illinois, 14, Kansas, 1; Louisiana, 2; New Mexico, 8, California, 182

Granuloma, coccidioidal California, 8

Leprosy: Florida, 2; Louisiana, 3, Texas, 6; California, 1, Hawaii Territory, 7.

Psittacosis New York, 2, Pennsylvania, 1, California, 1

Weil's disease· Michigan, 1, Washington, 14; Hawaii Territory, 4.

WEEKLY REPORTS FROM CITIES

City reports for week ended March. 7, 1942

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	6	0	1	0	4	0	4	0	0	0
Baltimore, Md	1	0	12	4	317	2	28	0	20	0	1	29
Billings, Mont	0	0	------	0	2	0	0	0	1	0	0	0
Birmingham, Ala	0	0	17	0	8	0	6	0	3	0	1	2
Boise, Idaho	0	0	------	0	0	0	0	0	0	0	0	0
Boston, Mass	0	0	------	1	96	0	26	0	86	0	0	43
Bridgeport, Conn	0	0	------	0	8	0	2	0	7	0	0	0
Brunswick, Ga	0	0	------	0	9	0	0	0	0	0	0	0
Buffalo, N Y	1	0	------	1	6	0	13	0	16	0	0	7
Camden, N J	0	0	1	0	10	0	4	0	17	0	0	0
Charleston, S C	0	0	97	1	0	2	3	0	1	0	0	0
Chicago, Ill	6	0	8	3	106	0	35	0	115	0	0	75
Cincinnati, Ohio	3	0	------	0	0	0	7	0	24	0	0	13
Cleveland, Ohio	1	0	11	0	11	2	6	0	76	0	1	17
Columbus, Ohio	1	0	1	1	11	0	5	0	1	0	0	12
Concord, N H	0	0	------	0	0	0	0	0	2	0	0	0
Cumberland, Md	0	0	------	0	0	2	0	0	1	0	0	0
Dallas, Tex	3	0	1	1	210	0	9	0	1	0	1	3
Denver, Colo	5	0	15	0	94	0	3	0	9	0	0	31
Detroit, Mich	2	0	1	1	70	0	28	0	151	0	0	33
Duluth, Minn	0	0	------	0	0	0	1	0	13	0	0	1
Fall River, Mass	1	0	------	3	11	1	1	0	35	0	0	1
Fargo, N Dak	0	0	------	0	1	0	1	0	0	0	0	7
Flint, Mich	0	0	------	0	1	0	4	0	4	0	0	3
Fort Wayne, Ind	0	0	------	0	1	0	4	0	2	0	1	0
Frederick, Md	0	0	------	0	12	0	0	0	0	0	0	0
Galveston, Tex	0	0	------	0	0	0	1	0	1	0	1	0
Grand Rapids, Mich	0	0	------	1	10	0	2	0	5	0	0	1
Great Falls, Mont	0	0	------	0	37	0	2	0	0	0	0	5
Hartford, Conn	0	0	------	0	16	1	5	0	3	0	0	2
Helena, Mont	0	0	------	0	3	0	1	0	0	0	0	0
Houston, Tex	1	0	------	0	52	0	17	0	4	0	1	0
Indianapolis, Ind	1	0	------	1	14	0	8	0	23	0	0	9
Kansas City, Mo	0	0	1	1	14	0	10	0	34	0	0	1
Kenosha, Wis	0	0	------	0	2	0	0	0	2	0	0	4
Little Rock, Ark	0	0	13	1	119	0	3	0	0	0	0	0
Los Angeles, Calif	8	0	24	0	422	0	13	1	38	0	1	23
Lynchburg, Va	0	0	------	0	0	0	0	0	1	0	0	6
Memphis, Tenn	0	0	7	5	2	0	4	0	4	1	2	4
Milwaukee, Wis	0	0	------	0	41	0	1	0	27	0	0	84
Minneapolis, Minn	2	0	------	0	93	0	5	0	28	0	0	9
Missoula, Mont	0	0	------	0	0	0	2	0	0	0	0	0
Mobile, Ala	1	0	2	0	0	0	1	0	1	0	0	0
Nashville, Tenn	0	0	------	2	1	0	5	0	7	0	0	6
Newark, N J	0	0	3	0	37	2	5	0	34	0	0	46
New Haven, Conn	0	0	------	0	147	0	0	0	0	0	0	7
New Orleans, La	0	0	3	2	21	1	12	1	4	0	0	3
New York, N. Y	24	5	17	4	51	4	77	0	263	0	3	224
Omaha, Nebr	1	0	------	0	105	0	6	0	3	0	0	0
Philadelphia, Pa	1	0	1	5	43	1	30	0	225	0	1	67
Pittsburgh, Pa	1	1	4	5	27	2	10	0	19	0	0	9
Portland, Me	0	0	------	0	8	0	2	0	1	0	0	0
Providence, R I	0	0	------	0	100	0	4	0	4	0	0	43
Pueblo, Colo	0	0	------	1	31	0	2	0	4	0	0	0
Racine, Wis	0	0	------	0	10	0	1	0	2	0	0	14
Reading, Pa	0	0	------	0	2	0	2	0	0	0	0	8
Richmond, Va	0	0	------	0	0	0	0	0	2	0	0	0

City reports for week ended March 7, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Roanoke, Va	0	0	------	0	1	0	0	0	0	0	0	0
Rochester, N. Y	0	0	------	0	6	0	1	0	12	0	0	13
Sacramento, Calif	0	0	------	0	123	1	3	0	2	0	0	20
Saint Joseph, Mo	0	0	------	0	8	0	3	0	3	0	0	0
Saint Louis, Mo	0	0	1	2	172	0	14	0	16	0	0	5
Saint Paul, Minn	2	0	------	0	508	0	2	1	7	0	0	20
Salt Lake City, Utah	0	0	------	0	6	0	2	0	3	0	0	9
San Antonio, Tex	0	1	2	0	8	0	9	0	3	0	0	0
San Francisco, Calif	3	0	------	0	64	1	12	0	15	0	0	10
Savannah, Ga	0	0	43	2	56	1	1	0	1	0	0	0
Seattle, Wash	1	0	------	2	1	1	6	0	4	0	0	37
Shreveport, La	0	0	------	0	10	0	7	0	2	0	3	0
South Bend, Ind	1	0	------	0	3	0	5	0	22	0	0	2
Spokane, Wash	0	0	------	0	9	0	3	0	1	0	0	4
Springfield, Ill	0	0	------	0	93	1	1	0	5	0	0	2
Springfield, Mass	0	0	------	0	12	0	5	0	10	0	0	14
Superior, Wisc	0	0	------	0	0	0	0	0	0	0	0	2
Syracuse, N Y	0	0	------	0	22	0	2	0	4	0	0	27
Tacoma, Wash	0	0	------	0	0	0	2	0	1	0	0	4
Tampa, Fla	0	0	------	0	10	0	2	0	0	0	0	0
Terre Haute, Ind	0	0	------	1	2	0	0	0	1	0	0	0
Topeka, Kans	0	0	------	0	2	0	6	0	2	0	0	7
Trenton, N J	0	0	------	0	4	0	2	0	7	0	0	6
Washington, D C	2	0	3	1	46	2	7	0	13	0	1	31
Wheeling, W. Va	0	0	------	0	0	0	2	0	0	0	0	0
Wichita, Kans	0	0	------	0	19	0	3	0	3	0	0	5
Wilmington, Del	0	0	------	0	0	0	5	0	11	0	0	0
Wilmington, N. C	0	0	------	0	192	0	1	0	0	0	0	0
Winston-Salem, N. C	0	0	------	0	127	0	1	0	0	0	0	0
Worcester, Mass	0	0	------	0	4	2	7	0	16	0	0	41

Dysentery, amebic.—Cases: Dallas, 1, New York, 4; St Louis, 1; Worcester, 1.
Dysentery, bacillary.—Cases: Los Angeles, 1, New York, 1.
Leprosy.—Cases. New Orleans, 1.
Typhus fever.—Cases. Savannah, 1.

Rates (annual basis) per 100,000 population for the group of 87 cities in the preceding table (estimated population, 1942, 33,962,266)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Mar. 7, 1942	11.21	45.14	7.98	598.93	82.14	229.07	0.15	2.30	170.57
Average for week, 1937-41	18.28	125.36	18.44	1,118.32	119.01	273.50	4.18	3.41	175.86

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended February 21, 1942.—During the week ended February 21, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		2	2	5	7		1		4	21
Chickenpox	1	17		190	427	63	37	20	150	905
Diphtheria	1	25		30	4	3	1		2	66
German measles	1	1		56	51	17	18	16	46	206
Influenza		9			20	5			20	54
Measles		5	1	555	117	166	47	6	38	935
Mumps	1	10		446	533	115	231	45	449	1,830
Pneumonia		8			4	1	2		9	24
Scarlet fever	3	19	7	93	311	49	32	62	38	614
Tuberculosis		4	13	64	47	46	4			178
Typhoid and paratyphoid fever				6						6
Undulant fever					1					1
Whooping cough		18	2	102	62	6	4	1	27	282
Other communicable diseases		1		7	214	34	7	1	4	268

CUBA

Habana—Communicable diseases—4 weeks ended March 7, 1942.—During the 4 weeks ended March 7, 1942, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	22	1	Scarlet fever	2	
Leprosy	1		Tuberculosis	13	3
Malaria	16		Typhoid fever	33	2
Measles	19				

Provinces—Notifiable diseases—4 weeks ended January 31, 1942.—During the 4 weeks ended January 31, 1942, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana[1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1	2	1	8		15	27
Chickenpox		1		1		1	3
Diphtheria	2	26	1	3	1	8	41
Hookworm disease		21					21
Leprosy		1			1	2	4
Malaria	176	37	1	12	2	540	768
Measles		6	1	5			12
Poliomyelitis		1					1
Scarlet fever		2					2
Trachoma				16			16
Tuberculosis	29	19	19	52	15	29	163
Typhoid fever	12	49	7	28	7	22	125
Whooping cough				1			1
Yaws						1	1

[1] Includes the city of Habana.

MALTA

Notifiable diseases—November 1941.—During the month of November 1941, certain notifiable diseases were reported in the Island of Malta, including the Island of Gozo as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cancer		1[1]	Lethargic encephalitis		1
Cerebrospinal meningitis	2	1	Measles	1	
Chickenpox	4		Nephritis		21
Diabetes mellitus		18	Pneumonia	54	14
Diarrhea and enteritis (under 2 years of age)		84	Puerperal fever	3	
			Scarlet fever	3	
Diphtheria	21	4	Trachoma	8	
Erysipelas	10		Tuberculosis (respiratory system)	20	13
Gastroenteritis		94	Typhoid fever	30	4
Influenza	4		Undulant fever	40	2
Leprosy		3	Whooping cough	29	

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given

CHOLERA

[C indicates cases, P, present]

NOTE —Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates

Place		January-December 1941	January 1942	February 1942—week ended— 7	14	21	28
ASIA							
Afghanistan Southern Province	C	P					
Ceylon	C	3					
China							
Canton	C	464					
Hong Kong	C	1 667					
Macao	C	1,475					
Shanghai	C	834					
India	C	97,826					
Bombay	C	15					
Calcutta	C	2,160					
Rangoon	C	116					
India (French)	C	34					
Japan Taiwan	C	2					

PLAGUE

[C indicates cases; P, present]

Place		January-December 1941	January 1942	February 1942—week ended— 7	14	21	28
AFRICA							
Belgian Congo	C	[1] 39					
British East Africa:							
Kenya	C	768					
Tanganyika Territory	C	2					
Uganda	C	198					
Egypt: **Port Said**	C	10					
Madagascar	C	285	22				[2] 19
Morocco	C	2,210	21	1	4	6	6
Casablanca [3]	C	4					
Tunisia: **Tunis**	C	2					
Union of South Africa	C	[4] 74	2				
ASIA							
China:							
Chekiang	C	[5] 125					
Fukien Province [6]							
Foochow	C	3					
Hunan Province	C	7					
Dutch East Indies:							
Java and Madura	C	[8] 401					
West Java	C	[8] 378					
India	C	4,144					
Calcutta	C	3					
Rangoon	C	9					
Indochina (French)	C	26					
Palestine: **Haifa**	C	10	2		1		
Plague-infected rats		2					
Thailand: Lampang Province	C	3					
EUROPE							
Portugal: Azores Islands	C	3					
NORTH AMERICA							
Canada—Alberta: Plague-infected ground squirrel		1					
SOUTH AMERICA							
Argentina:							
Buenos Aires Province	C	3					
Cordoba Province	C	[9] 70					
Mendoza Province	C	3					
Santa Fe Province: Plague-infected rats		67					
Santiago del Estero Province	C	2					
Brazil:							
Alagoas State	C	4					
Bahia State	C	1	1				
Pernambuco State	C	96					
Rio de Janeiro State	C	2					
Chile:							
Santiago	C	[10] 1					
Valparaiso	C	2		1			
Ecuador	C	[11] 33					
Peru:							
Ancash Department	C	10	6				
Lambayeque Department	C	3					
Libertad Department	C	12	2				
Salaverry: Plague-infected rats			P				

[1] Includes 21 cases of pneumonic plague.
[2] For the month of February.
[3] A report dated June 23, 1941, stated that an outbreak of plague had occurred in Casablanca, Morocco, where several deaths had been reported.
[4] Final figures for the year indicate 74 cases were reported instead of 93 cases as previously published.
[5] October 2 to December 6, 1941.
[6] A report dated Nov. 22, 1941, stated an [illegible] Yingkow, Fukien Province, China.
[7] For November and December 1941.
[8] January to October 25, 1941.
[9] Includes 3 cases of pneumonic plague.
[10] Imported.
[11] January to April 1941, inclusive.

PLAGUE—Continued

[C indicates cases P, present]

Place		January-December 1941	January 1942	February 1942—week ended— 7	14	21	28
SOUTH AMERICA—continued							
Peru—Continued							
Lima Department	C	24	14				
Moquegua Department—Ilo	C	7					
Piura Department	C	11	3				
OCEANIA							
Hawaii Territory [11] Plague infected rats		75	8	1	1		
New Caledonia	C	11					

[11] During April and May 1941 4 lots of plague infected fleas were also reported in Hawaii Territory

SMALLPOX

[C indicates cases]

Place		January-December 1941	January 1942	February 1942—week ended— 7	14	21	28
Algeria	C	935	150			23	
Angola	C	[1] 120					
Belgian Congo	C	682					
British East Africa	C	72					
Dahomey	C	407					
French Guinea	C	45					
French West Africa	C	3	41				[2] 133
Gold Coast	C	510					
Ivory Coast	C	40					
Morocco [3]	C	648	441	112		[illegible]	88
Nigeria	C	1 026					
Niger Territory	C	273					
Portuguese East Africa	C	9					
Portuguese Guinea	C	20					
Rhodesia Southern	C	86					
Senegal	C	65					
Sierra Leone	C	15					
Sudan (Anglo Egyptian)	C	[illegible]					
Sudan (French)	C	11					
Tunisia Tunis	C	41					
Union of South Africa	C	758					
ASIA							
Ceylon	C	114					
China	C	259					
Chosen	C	696					
Dutch East Indies Bali Island	C	3					
India	C	24 484					
India (French)	C	9					
India (Portuguese)	C	70					
Indochina (French)	C	1 298	137				[2] 313
Iran	C	8					
Iraq	C	1 593	9				
Japan	C	200					
Straits Settlements	C	1					
Syria	C	1					
Thailand	C	303					
EUROPE							
France							
Seine Department	C						[2] 41
Unoccupied zone	C	1		[5] 6	7		
Portugal	C	53	8	2			
Spain	C	457	20				
Switzerland	C	1					---

[1] For June
[2] For February
[3] A report dated Dec 31 1941 stated that an epidemic of smallpox had occurred near Casablanca Morocco, where about 100 cases per week were reported
[4] For December
[5] Imported

SMALLPOX—Continued

[C indicates cases]

Place		January–December 1941	January 1942	February 1942—week ended— 7	14	21	28
NORTH AMERICA							
Canada	C	25					
Dominican Republic	C	2					
Guatemala	C	6					
Mexico	C	321					
Panama Canal Zone (alastrim)	C	[6] 11					
SOUTH AMERICA							
Bolivia	C	18					
Brazil	C	[7] 1					
Colombia	C	935					
Paraguay	C	[8] 8					
Peru	C	1 841					
Uruguay	C	7					
Venezuela (alastrim)	C	254	36				

[6] October, November, and December.
[7] For August.
[8] January, February, and March.

TYPHUS FEVER

[C indicates cases]

Place		January–December 1941	January 1942	February 1942—week ended— 7	14	21	28
AFRICA							
Algeria	C	12 827	3 362			1 988	
British East Africa: Kenya	C	12					
Egypt	C	9 324	1 189	515			
Morocco [1]	C	1 471	1 443	634	646	793	868
Sierra Leone	C	[illegible]					
Tunisia	C	7 078	1 819	416			
Union of South Africa	C	780					
ASIA							
China	C	245					
Chosen	C	42[illegible]					
Dutch East Indies: Sumatra	C	13[illegible]					
India	C	4	3				
Iran	C	11[illegible]					
Iraq	C	[illegible]3	3				
Japan	C	864					
Malaya: Unfederated States	C	1					
Palestine	C	2 2	4				
Straits Settlements	C	8					
Trans-Jordan	C	9					
EUROPE							
Bulgaria	C	284	27	3		22	42
Czechoslovakia	C	28					
France (unoccupied zone)	C	2		[2] 2			[2] 2
Germany	C	2 158					
Gibraltar	C	2					
Greece	C	7					
Hungary	C	652	122	19	13	32	42
Irish Free State	C	26					
Poland	C	3 786					
Portugal	C	50					
Rumania	C	1 827	688	199	152	237	106
Spain	C	9 560	975				
Switzerland	C	5					
Turkey	C	704		12	38	15	21
Union of Soviet Socialist Republics [3]	C		[4] 16				
Yugoslavia	C	86					

[1] Information dated Dec. 31, 1941, reports typhus fever present in epidemic form in Casablanca, Morocco.
[2] Imported.
[3] See also PUBLIC HEALTH REPORTS of Mar. 13, 1942, p. 407.
[4] For 1 week.

TYPHUS FEVER—Continued

[C indicates cases]

Place		January–December 1941	January 1942	February 1942—week ended— 7	14	21	28
NORTH AMERICA							
Guatemala	C	190	14				[5] 14
Jamaica	C		1	2	2		
Mexico	C	222					
Panama Canal Zone	C	5					
Puerto Rico	C	12	2		1		
SOUTH AMERICA							
Bolivia	C	[6] 75					
Brazil	C	1					
Chile	C	337					
Colombia	C	11					
Ecuador	C	127	7				
Peru	C	1 435					
Venezuela	C	59					
OCEANIA							
Australia	C	15	4				
Hawaii Territory	C	60	8	1	2	1	

[5] For February

[6] For January February and March

YELLOW FEVER

[C indicates cases D deaths]

AFRICA					
Belgian Congo					
Aba	C	[1] 2			
Kimvulu	C	1			
Libenge	C	1			
Stanleyville	D	[1] 1			
British East Africa Uganda	C	1			
Dahomey Grand Pop	C	[1] 2			
French Equatorial Africa.					
Gabon	C	2			
Mayumba	C	4			
French Guinea	C	[2] 3			
French West Africa	C	5	1		
Gold Coast	C	[2] 3			
Accra	C	1			
Ivory Coast	C	[3] 8	1		
Nigeria	C	[1] 1			
Senegal [4]					
Sierra Leone Freetown	C		1		
Spanish Guinea	D	4			
Sudan (French)	C	[5] 11	[1] 1		
Togo Hohoe	C		1		
SOUTH AMERICA [6]					
Brazil					
Acre Territory	D	1			
Amazonas State	D	4			
Bahia State	D	3			
Para State	D	8			
Colombia					
Antioquia Department	D	3			
Boyaca Department	D	8		2	
Intendencia of Meta	D	15	1		
Santander Department	D	20	1		
Tolima Department	D	1			
Peru Junin Department	C	5			
Venezuela Bolivar State	C	1			

[1] Suspected

[2] Includes 1 suspected case

[3] Includes 4 suspected cases

[4] According to information dated Feb 9, 1942, 15 deaths from yellow fever among Europeans have occurred in Senegal

[5] Includes 5 suspected cases

[6] All yellow fever in South America is of the jungle type unless otherwise specified.

COURT DECISION ON PUBLIC HEALTH

Sewage disposal—statute held valid—action of State board of health and State committee on water pollution held authorized.—(Wisconsin Supreme Court; *State ex rel. Martin, Attorney General,* v. *City of Juneau,* 300 N. W. 187; decided October 7, 1941.) The State Board of Health and the State Committee on Water Pollution of Wisconsin found that the discharge of inadequately treated sewage from the city of Juneau into a drainage ditch caused, among other things, a menace to public health and a nuisance. Based on these findings the board and committee ordered that the city take immediate steps to secure detailed plans and specifications for a complete sewage treatment system or plant adequate to meet local needs, which plans and specifications were to be submitted to the board for approval in accordance with statutory requirements. It was also ordered that the treatment system or plant be installed and placed in operation in a little less than a year and that it be so operated and maintained as to prevent objectionable pollution conditions in the ditch. The city failed to comply with the order and the State sought a mandatory injunction commanding the city to comply and asking that it be enjoined from discharging inadequately treated sewage into the drainage ditch after a reasonable time to be determined by the court. The city did not pursue the statutory remedies provided for the review of the order or the arbitration of the question, and the Supreme Court of Wisconsin said that, because of the city's failure to avail itself of the remedies provided, it was considered that in the instant action the city was foreclosed from raising any questions except (1) the validity of chapter 144 of the Wisconsin Statutes, and (2) whether the State board of health and the State committee on water pollution acted within the powers conferred upon them by statute. The city, upon appeal by it from the lower court's order, contended that chapter 144 was invalid and unconstitutional because (1) it was vague and indefinite and incapable of enforcement, (2) it unlawfully delegated both legislative and judicial power, and (3) it was unreasonable, arbitrary, and oppressive.

The purpose of the statute respecting the State committee on water pollution was to prevent pollution of the waters of the State and under it the committee had the duty and power to issue special orders directing particular owners to secure such operating results toward pollution control as the committee might prescribe. One objection of the city was that because the words "operating results" were not specifically defined the statute was invalid because indefinite. The supreme court said that it would seem to be reasonably plain that an operating result was one which prevented pollution and rejected this

objection and stated that other specific objections of the same general character did not need to be separately considered. Relative to the question of delegation of legislative and judicial power, it was the view of the court that the limitations upon the power to delegate had not been exceeded by the provisions of chapter 144. The appellate court also pointed out that what the statute conferred upon the State board of health and the State committee on water pollution was authority to promote public health. "The discretion vested in" the board and committee "is not arbitrary, it is subject to court review and the rights of all parties are fully protected." Neither did the court find any basis for the city's contention that the board and committee had acted beyond and without the powers conferred upon them by chapter 144.

The statute being valid and the board and committee having acted within their statutory powers, the supreme court affirmed the lower court's order.

COURT DECISION ON PUBLIC HEALTH

Statutes regarding appointment of health officer for particular county alone held unconstitutional.—(North Carolina Supreme Court; *Board of Health of Nash County et al.* v. *Board of Commissioners of Nash County et al.*, 16 S.E.2d 677; decided October 8, 1941.) The general statutory law of North Carolina provided that a county board of health should elect either a county physician or a county health officer. In 1941 the State legislature enacted 2 statutes which by their terms applied only to Nash County, 1 out of the 100 counties of the State. These statutes, the later of which amended the prior one, provided substantially that the appointment of a health officer of Nash County should not become effective until approved by the board of county commissioners and that, if the health officer appointed by the board of health should be disapproved by the county commissioners, such appointee would be ineligible and the board of health should, within 30 days, appoint some other person. It was further provided that, if the county commissioners failed to approve the second appointee, the secretary of the State board of health should appoint, etc. The Nash County Board of Health appointed a certain person as health officer and the board of commissioners of the county disapproved such appointment. The board of health took no further action in the matter but in a proceeding contended that the two 1941 statutes referred to were unconstitutional and void because in violation of a State constitutional provision which read, in part, that the general assembly "shall not pass any local, private, or special act or resolution * * * relating to health, sanitation, and the abatement of nuisances."

The Supreme Court of North Carolina stated that there was no room to doubt that the said statutes were local and that the court was committed to the proposition that a law affecting the selection of officers to whom was given the duty of administering health laws was a law "relating to health." "We have become increasingly conscious," said the court, "of the fact that many of the problems which heretofore we have considered purely local are so related to the welfare of the whole State as to demand uniform and coordinated action under general laws." The constitutional provision in question was stated to mention especially general laws relating to health as being within its protective purview, "recognizing that the alleviation of suffering and disease, the eradication or reduction of communicable disease in its humanitarian, social, and economic aspect, is a State-wide problem which ought not to be interfered with by local dilatory laws which are so frequently the outcome of local indifferency, or factional and political disagreements." It was the court's view that the two 1941 statutes involved were unconstitutional and void and that the election of a county health officer by the board of health was valid and effective without reference to any act by the county commissioners.

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AN APPRAISAL TECHNIQUE FOR URBAN PROBLEM AREAS AS A BASIS FOR HOUSING POLICY OF LOCAL GOVERNMENTS

Report of the SUBCOMMITTEE ON APPRAISAL OF RESIDENTIAL AREAS,* *Committee on the Hygiene of Housing, American Public Health Association*

III. USE OF THE TECHNIQUE IN PLANNING REMEDIAL ACTION FOR A REPRESENTATIVE PROBLEM AREA [1]

Essentials in the analysis of survey data.—The touchstone of any survey is the readiness with which the collected data lend themselves to analysis—the process which brings order and meaning into masses of raw data. A scheme of analysis that will reveal significant relationships in lucid and economical fashion must be an integral part of a good survey procedure.

In qualitative appraisals such as the technique under discussion, the use of index items and rating scores contributes to the desired clarity and economy of interpretation in two fundamental ways. First, it gives summary expression to the over-all quality of the observed phenomena; second, it facilitates the analysis of interrelationships among these phenomena.

In the preceding section of this report it was shown that penalty scores for survey areas taken as a whole *do* give summary expression to the over-all character of these areas and facilitate the comparison of their housing quality. But for full understanding of the internal problems of an area, and for the shaping of official policy with respect to it, the over-all ratings must be supplemented by more detailed examination.

The point of view from which analyses are made is most important, since the choice of a principal classification for tabulation of the data implies that study of this particular category will yield both valid generalizations and guides to concrete action.

Three basic classifications for the analysis of housing data which may be expected to reveal significant relationships are: (1) character of the dwellings, (2) character of the families housed, and (3) areal subdivisions of the district surveyed.

1. Analysis by character of dwellings is based on the assumption that in any area a given type of housing accommodation (tenement, one-family dwelling,

* Adapted from report to Thirteenth Meeting of Committee on the Hygiene of Housing, Washington, D. C., February 2, 1942. Prepared by Allan A. Twichell, Andrée Emery, and Anatole Solow.

[1] The earlier sections of this report appeared in the PUBLIC HEALTH REPORTS, 57: 285–296 (1942).

rooming house, building with mixed residential and business uses, etc.) may have inherent qualities which differentiate it from other types, and that these qualities should govern the formulation of official policy and action. Aside from the type of building, other characteristics such as monthly dwelling rental or age of building may provide revealing subclassifications.

2. Since housing problems derive not only from physical conditions but also from social and economic relationships, it is important to analyze the data in terms of the principal sociological characteristics of the families housed. Tabulation of essential data according to differences in race or nationality, income, and size of family may be needed to disclose important housing problems associated with these characteristics.

3. Underlying the analysis by areal subdivisions is the hypothesis that the district surveyed may contain subareas which are relatively homogeneous with respect to significant attributes, and within which more or less uniform action can be taken. For this type of determination, essential data should ordinarily be tabulated by city blocks, but where conditions vary greatly within the blocks it may be preferable to break the data down by street frontages. It will then be seen whether blocks or frontages with similar characteristics fall into larger homogeneous subareas for treatment.

The central substandard district previously described (survey area II)[2] well illustrates the range of housing deficiencies which make a slum area the daily concern of one city department or another. Area II will therefore now be briefly appraised by means of selected analyses under the three headings just mentioned. It is not intended here to develop the findings in such detail as would be required to form the basis for a fully integrated housing program. It is rather the purpose to show that interpretation of basic data under even a few subclassifications will disclose the nature of an area's housing problem and will produce usable directives for remedial action.

Analysis by character of dwellings—type of structure.—In area II the number of structures is about equally divided between tenement (three-or-more-family) and nontenement types Thirty percent of the buildings which contain residences, however, also have business or other nonresidential uses, and this condition is by no means restricted to the tenements. In the belief that significant problems might be associated with these mixed uses, the following classification of structure types was used for tabulation of the data on physical deficiencies:

Dwelling structure without business	*Dwelling structure with business*
1-family	1-family
2-family	2-family
3-or-more-family (tenement)	3-or-more-family (tenement)

Review of conditions according to this classification revealed that physical deficiencies are far worse in buildings with mixed residential

[2] This mixed business and residential district of a Connecticut city, comprising 849 dwelling units, is described in the issue of the PUBLIC HEALTH REPORTS previously cited. The general characteristics of the area are given on page 290, and the salient housing characteristics are shown in figure 1, page 291.

and business uses than in the purely residential buildings. The poorest of all types was the tenement with mixed uses. In the purely residential class of structures, tenements were worse on the whole than the one- and two-family houses. The distribution of selected deficiencies in the various types of buildings is presented in figure 1.

In tenements with mixed business and residential uses, one-half or more of the dwelling units have the following deficiencies: No bathing facilities; toilets outside the dwelling unit; toilets shared by two or more families; toilets in poor sanitary condition. Fifty-seven

PERCENTAGE OF DWELLING UNITS WITH SELECTED DEFICIENCIES IN VARIOUS TYPES OF STRUCTURES IN SURVEY AREA II

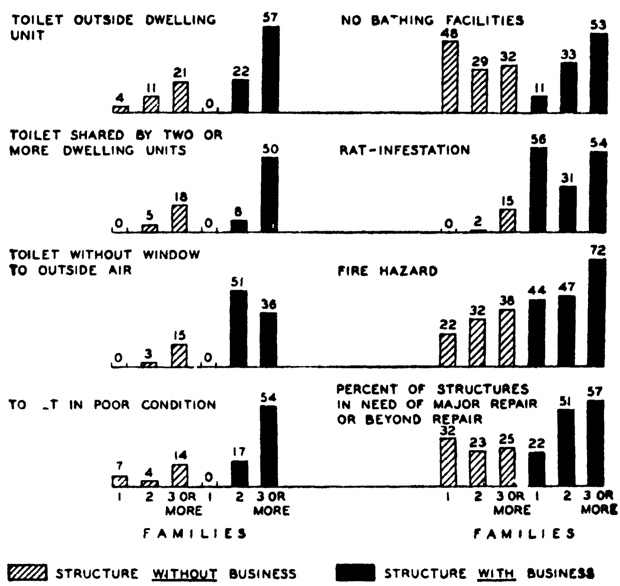

FIGURE 1

percent of these tenements with mixed uses are reported either in need of major repairs or beyond repair; the proportion of dwelling units subject to fire hazard is nearly twice as large as in purely residential tenements; and more than half of these mixed tenements are infested with rats. Rat infestation, however, is marked in all types of mixed residential and business buildings, largely because of the nature of businesses conducted on the premises, which include numerous food-handling and junk-storage establishments.[3]

It is evident that enforcement or other remedial action for this area must recognize the concentration of physical deficiencies in

[3] The field schedules for this technique (appended hereto) are designed to record infestation only as reported by the householder (See dwelling-unit schedule, item F) In this particular area, however, the health department inspector confirmed the infestation before recording it Thus the figures on infestation for area II may be taken as authentic and conservative

tenements and other buildings with mixed uses, although basic deficiencies among the dilapidated one-family houses without business will also need serious attention. (See figure 1 for condition of repair and bathing facilities.)

In addition to the type of structure, the dwelling rent is often used as a basis for tabulation and analysis, on the assumption that rental values will reflect the quality of dwellings. In fact, it is often contended that rental alone is a valid indicator of problem areas. It is therefore worthy of note that in area II as a whole the rents bear little relation to the quality of dwellings, as to either their facilities or their general condition. The reason for this anomalous situation will appear in considering the racial problem of the area.

Analysis by character of family—race.—In districts inhabited by both Negroes and whites, the housing conditions and needs of these two groups may differ so radically that it is essential to recognize the

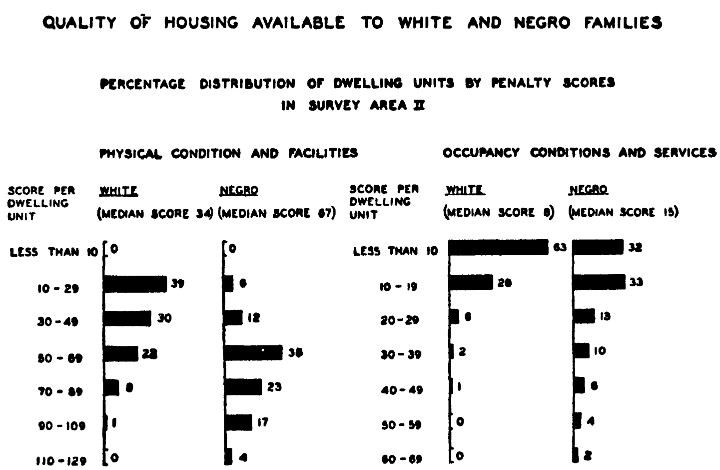

FIGURE 2.

race difference as one of the basic factors in analysis. This is not merely a theoretical venture but is a necessary step toward practical action, for the Negro housing problem is usually both more acute and more difficult to cope with than that of any other population group.

In area II, about 30 percent of the dwelling units are occupied by Negroes. Had these units been concentrated in a distinct Negro district, as is so often the case, the tabulation of penalty scores and basic deficiencies by areal subdivisions, as considered in later paragraphs, might have served to clarify the Negro housing problem of the area. The dwellings of colored families, however, were found generally intermingled with those of whites, and separate analysis by race of families was required.

Results of this study are the most striking of any obtained in the three test surveys. Tabulation of penalty scores for the physical condition of dwelling units of whites and Negroes shows both an appalling discrepancy between the quality of housing available to these two groups and clear evidence that Negroes on the average pay higher rents for the same quality of housing.

Whereas the median physical penalty score for all dwelling units in the area is 50 points, it is 67 for units occupied by Negroes and only 34 for those of whites. As shown in figure 2, 69 percent of the units occupied by whites have penalty scores of less than 50 points, as against only 18 percent of the Negro accommodations. Every fifth Negro dwelling unit incurs a physical penalty of 90 points or over—possible

PERCENTAGE OF DWELLING UNITS WITH SELECTED DEFICIENCIES INHABITED BY WHITES AND NEGROES IN SURVEY AREA II

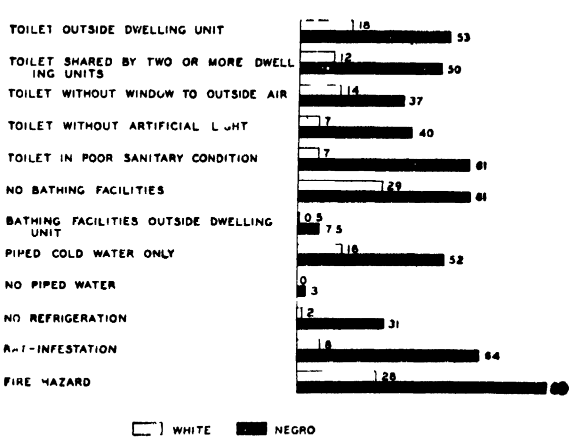

FIGURE 3

only in houses of the most primitive or degraded type—whereas only one of every hundred white units has such a high penalty score.

The median occupancy penalty score is 15 points for Negroes as compared with 8 for whites. One-eighth of the colored families live under conditions characterized by occupancy penalties of 40 points or more. Penalties of this magnitude generally occur only where every form of crowding is extreme and where landlord services are completely lacking.

The incidence of selected deficiencies in dwellings occupied by Negroes and whites is shown in figure 3, which tells its own story of inequality.

In addition to the conditions indicated in figure 3, the majority of Negro dwellings are located in structures reported either in need of major repairs or beyond repair. Only a negligible proportion of the

Negroes live in structures in good condition. Doubling of families in a dwelling unit, generally a most serious form of overcrowding and one which may result either from housing shortage or from a need to share excessive rents, was found in less than 1 percent of the dwelling units of white families but in over 7 percent of the Negro units.

The table below reveals still further the qualitative gap between the housing facilities available to whites and Negroes in this area.

White and Negro dwellings in 4 rent classes by physical penalty scores

Net rent per dwelling unit	Penalty score—points			Net rent per dwelling unit	Penalty score—points		
	Minimum	Median	Maximum		Minimum	Median	Maximum
$10 00-$14 99:				$20 00-$24 99:			
White	51	57	91	White	22	24	70
Negro	62	81	121	Negro	42	63	88
$15 00-$19 99				$25 00-$29 99			
White	21	47	85	White	15	29	44
Negro	54	74	114	Negro	24	41	99

In each rent class, the penalty scores for physical condition are far higher for Negro dwellings than for those of whites. The most striking case occurs in the $20–$25 rent group, where the median penalty is 63 points for Negro dwellings, as against 24 points for those occupied by whites.

In short, the housing occupied by Negroes in this slum area, as measured by our provisional rating scale, is physically about twice as bad over-all as that of the whites; in the various rental brackets the median Negro dwelling shows from about 1⅓ to over 2½ times as heavy a physical penalty score as that of the median white dwelling. Overcrowding and other occupancy problems in general are also about twice as serious for colored families as for whites. It is clear that a drastic solution is needed for the Negro housing problem here: either new public housing facilities or other truly low-rent schemes adapted to the needs of this particular group of the population.

Analysis by areal subdivisions—blocks.—For systematic law enforcement and various other kinds of housing action it is essential to know whether a major survey area contains subareas of sufficiently distinct character to require differential treatment. To illustrate the results yielded by analysis of areal subdivisions, an area comprising 14 representative blocks in the heart of the central substandard district has been studied.

The average physical-condition penalty score of dwelling units in these blocks was 51 points, which is so high that the area may be considered seriously substandard. The individual blocks, however, differ considerably and seem to fall into three classes according to the average penalty score within the blocks. These classes are shown in

figure 4 as A, B, and C. In class A the average physical penalty score per block is 29 points, the averages of individual blocks ranging from 24 to 36 points. Class B has a range of block averages from 43 to 59 penalty points, with a class average of 53. Blocks in class C average 81 points, and range from 72 to 96 points.

While the housing in class A blocks thus appears only moderately deficient on the physical side, the blocks in group C reveal an extreme slum character. It is doubtful that any remedy less drastic than complete demolition of the housing structures can be applied to blocks in this latter class, where further analysis of deficiencies has shown that all structures are in serious disrepair; where 90 percent of dwellings are deficient in toilet facilities and 85 percent lack bathing facilities; where, further, 30 percent of the units occur in daylight-crowded structures.

Although conditions in class B blocks are slightly better, it seems improbable that the majority of substandard structures could be re-

CLASSIFICATION OF BLOCKS IN CENTRAL SUBSTANDARD AREA BY PHYSICAL QUALITY OF HOUSING

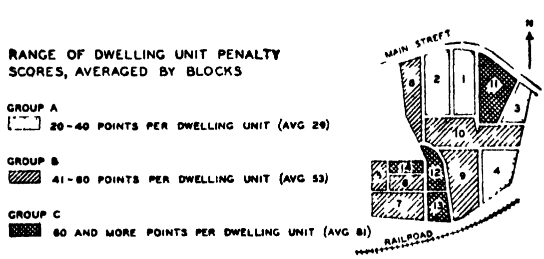

FIGURE 4

habilitated on any profitable basis, for many of them are characterized by serious lack of repair and by primitive toilet, bathing, and heating facilities.

Even in the A blocks, 20 percent of the dwellings have penalty scores of 40 points or more, but this class as a whole shows distinctly better characteristics than the remainder of the area. In this group of blocks only 14 percent of dwellings are deficient in toilet facilities and 21 percent in bathing facilities; need of major repairs is reported for one-third of the units. The indication is, therefore, that conditions in these blocks could be brought up to an acceptable standard by demolition of a few of the worst structures and by improvements of sanitary facilities and some structural repair in others. The demolition of structures beyond rehabilitation would also somewhat alleviate daylight-crowding, and might tend to retard further blighting within these blocks. A glance at the map, however, shows that the blocks

in these three classes do not form compact subareas. Therefore, while remedial action might prolong the useful life of class A blocks, these are so intermixed with blocks of definite slum character that it would be unsound policy to plan for their improvement without further considering the ultimate fate of the area as a whole.

This area is located between a main railroad line and the principal downtown business street, and is traversed by main trucking arteries. Approximately half of the buildings in the district are entirely business or industrial—a condition inimical to a satisfactory housing environment. Although further studies from the city-planning viewpoint would be needed to determine the specific uses for which this area should be replanned, even a cursory review of neighborhood characteristics indicates that it is not suitable for continued residential use. Any schemes of rehabilitation or mandatory repair should therefore be keyed to the possibilities of converting the area to purposes other than housing.

Implications for early official action.—It is believed that even this partial interpretation of the data has demonstrated the value of this appraisal technique as a diagnostic tool in the hand of official agencies, both for the broad evaluation of housing quality in terms of healthfulness, safety, and livability, and for consideration of specific enforcement and rehabilitation problems in a slum area. Aside from questions of basic housing policy which will be considered in the closing section, there become evident several types of action which should be taken immediately by local agencies of the city studied, in order to remove threats to human health and safety or to conserve marginal dwellings which must be kept in use during the war emergency.

1. *Housing inspection and law enforcement.*—Numerous hazards and legal violations were revealed by this health department survey which warrant special enforcement measures by that department or further appraisal and appropriate action by the technical personnel of other city departments concerned with housing. Within the province of the health department would lie reinspection and abatement in dwellings where serious crowding was indicated, a drive against rat infestation in tenements and other premises with mixed uses, special sanitary policing of structures having shared toilets and of those showing insanitary condition of toilets or garbage accumulations in the yard, and other measures to enforce specific provisions of present laws.

The building department should make skilled appraisals and issue appropriate enforcement orders with respect to buildings where extreme structural deterioration has been reported. The fire department should undertake similar enforcement in those premises where specific fire hazards were observed.

The basic appraisal should be extended, with similar cooperation between the city departments on technical refinements, to all other problem areas in the city—either as known to local officials to be substandard or as shown by the block data tabulations of the 1940 Federal housing census to be of doubtful quality.

2. *Formulation of an official minimum housing standard.*—An early step should be the review of the appraisal data as the basis for setting a local standard below which dwellings would be closed or demolished as fast as new construction or

rehabilitation permitted rehousing the families concerned. Present laws and ordinances deal with various deficiencies as separate problems, but they give no objective basis for determining the point at which the combined defects, or over-all quality, of a dwelling render it unfit for human habitation. A new type of standard is therefore needed, which will set forth the minimum combination of facilities and conditions prerequisite to continued occupancy—a standard of *over-all fitness for habitation.*[4]

Because of the power of the building department to order demolition of unsafe buildings and the power of the health department to order the closing of insanitary structures or those otherwise unfit for human habitation, the minimum standard for human occupancy should be arrived at jointly by these two agencies; it would be highly desirable to enlist the cooperation of the fire department in formulating those elements of the standard concerned with fire hazard.

Once this standard is established, the penalty scores for individual buildings in area II, together with the data on individual deficiencies of each building, will reveal those structures which should be demolished or vacated and those where compliance with the new standard could be ordered.

3. *New legal controls.*—In this particular community, as in many others, the principal weakness of existing laws and ordinances lies in their failure to require in one- and two-family houses some of the basic safeguards and amenities prescribed for tenements. This survey has shown that nontenement dwellings need protection under the law no less than tenements with respect to condition of repair, fire hazards, and infestation; certain toilet conditions in nontenement dwellings should also be dealt with by the legal regulations.

The prevalence of highly unsatisfactory occupancy conditions has suggested the need for a new type of overcrowding regulation; perhaps one under which the maximum capacity, in persons, of at least each multiple dwelling must be posted as a stimulus to observation by inspectors and a deterrent to willful violation by either landlord or tenant.

4. *Measurement of the need for new low-rent housing facilities.*—It has been shown that perhaps half of the dwellings in this central district are physically so defective as to preclude their rehabilitation on any economic basis. Extension of the appraisal to other problem areas would make it possible to judge the total number of structures in the city which should be demolished as part of a long-range program, as well as the number of families in need of housing assistance because of poor facilities, overcrowding, or an intolerably high ratio of rent to income. Such investigation should, of course, pay particular attention to the problems of Negro families, for 80 percent of them in area II have been shown to live in dwellings of a character which may be irremediable except by demolition.

IV. OBJECTIVE APPRAISAL—A TOOL FOR SHAPING BASIC HOUSING POLICIES

Housing betterment has long pivoted around two poles: enforcement of the restrictive powers exercised by health or building departments and development of constructive measures such as govern-

[4] While the Committee on the Hygiene of Housing has dealt with the subject of housing standards in its Basic Principles of Healthful Housing, no attempt is made here to define substandard housing conditions as the basis for legal action. The subcommittee believes that housing standards which are to form the basis for law enforcement should be formulated locally in terms of prevalent housing deficiencies and with due regard to actual possibilities of enforcement. The rating system of this technique is, of course, intended to be used both in formulating standards and in measuring degrees of substandardness in specific structures, blocks, or larger areas.

mental subsidy for new housing facilities. Forty years ago it was inconceivable that large-scale housing progress in America could come about through any better means than well-drawn regulations under the police power. Ten years ago progressive housers concerned themselves primarily with public housing, and the improvement or extension of regulatory measures fell somewhat out of fashion, for in the minds of many the housing problem was to be solved categorically by the employment of governmental subsidies for new construction.

A balance between these two schools of thought is now being achieved, to which the war lends added meaning. A strengthening of regulatory measures becomes vital for the conservation of our housing resources in a period marked by cessation of normal building, while constructive programs have broadened from public housing alone to cover neighborhood rehabilitation and the replanning of entire communities. The distinction between restrictive and constructive measures has therefore lost its traditional sharpness. During the war and for post-war housing programs both types of action will be needed.

Determining the extent to which conservation or construction should be pursued is one of the first problems encountered in a comprehensive approach to housing. To make such determinations possible was a primary objective of the subcommittee in the development of this appraisal method. Rough descriptions such as the standard real property inventories are not sufficiently precise or adaptable tools for the varied requirements of modern urban planning. A procedure is needed which will express fine distinctions between various housing areas or between major categories of shelter, and which at the same time can serve as a basis for the qualitative classification of individual dwellings, structures, or areas.

The study of one substandard area above has shown some of the types of local action which may immediately arise out of basic surveys and appraisals in limited survey areas—without important changes in the viewpoints, organization, or policies of official agencies. The following are suggestions of more far-reaching consequences which may result if the idea of qualitative appraisal is adopted as a foundation-stone of housing policy, and if the various bodies concerned with housing develop further the trend toward cooperative effort already evident in many places.

1. *Systematic inspection and coordinated enforcement.*—Sporadic enforcement of housing regulations has been characteristic of most cities. One reason has been the chronic shortage of replacement dwellings for families in structures ripe for condemnation; other factors have been the resistance of the courts to vigorous action against an owner's rights in property, the lack of reasonably precise tools for

measurement of over-all housing quality, and the tradition that inspection and enforcement need be put in motion only upon receipt of specific complaints.

Responsible city officials have come to recognize that certain types of housing deficiency are detrimental to families or to the community whether or not complaints are made. In a growing number of cities, therefore, enforcement based on complaints is being supplanted by systematic inspection, coupled with appropriate routine enforcement, throughout districts of poor quality or among types of dwellings presenting special problems.

Such measures should not be, as they often are, the sole concern of one city bureau which happens to have some curiosity about its housing job. The health department, the building department, the fire department, and newer bodies like the housing authority and the planning commission have interdependent responsibilities. In treating its own aspect of the problem each can be effective only if it has reasonable knowledge of the basic facts and some understanding of their policy implications. Cooperation between these agencies should be axiomatic, for it will make enforcement schemes more complete, more effective, and more economical.

A technique for objective appraisal of housing adequacy not only lends itself to the promotion of cooperative effort, but is close to being the kernel of it. Such appraisal permits the designation and classification of problem areas which call for different types of administrative action appr. priate to various official or unofficial agencies, and it produces basic records around which a central repository can be maintained, accessible to all groups concerned.

In some cities the data from quite limited surveys, or even the findings on flagrantly bad individual properties, have been used with notable effect as publicity material to muster public sentiment in support of adequate enforcement. Surveys which both measure the full extent of the local housing problem and lay the foundation for a comprehensive solution should be invaluable in gaining popular support for needed enforcement programs, including needed appropriations for personnel to carry them out.

2. *Housing standards for other purposes than law enforcement.*—Official housing standards of the type discussed above will be useful to numerous organizations aside from those normally charged with housing enforcement, especially if the standards be related to a scheme of appraisal which permits measurement of degrees of substandardness.

Public and private welfare agencies are generally aware that seriously substandard housing facilities or extreme overcrowding may tend to undermine the health and morale of their client families. Many of these bodies are developing or wish to develop housing

standards according to which rental payments for dependent families may be scaled. Relief agencies are particularly important among the potential supporters of official standards and discriminating appraisal methods, for in the long run they can bring tremendous leverage to bear for housing improvement through their rent-paying relationship to large numbers of property holders. The support of official and private welfare groups for the promulgation of official standards and also their help in drafting such standards should be more widely cultivated.

Local housing authorities might embody the official standards in their tenant-selection regulations for new projects and could recognize the appraisal ratings of individual family conditions as a primary measure of housing need. Rent-control boards could similarly use the standards and the ratings in rent disputes, adopting official substandardness as a ground for revoking unjust rent increases.

It may be impossible as a general thing to interest local tax officials in checking their assessed values for low-grade dwellings against a basic appraisal of healthfulness and livability. Pressure can and should be brought to bear on these officials, however, as it has been in at least one housing-conscious city, to the end that if incurably substandard structures revert to the city for delinquent taxes they shall promptly be destroyed rather than thrown back on the real-estate market because the city's left hand knows not the business of its right hand.

3. *Synthesis of regulatory and constructive powers.*—A general limitation of housing regulations is their failure to develop possible punitive actions beyond demolition, closure, or token fines. Housing consciousness, on the part of both the general public and the courts, has reached an all-time high, and it is reasonable to expect that broad support would be given to measures calling for a policy of discrimination as well as overt action, stipulating, for example, that in premises where substandardness is established by objective appraisal, rents may not be increased[5] or possibly even that they may not be maintained above a level set to penalize substandardness.

A second and striking weakness of restrictive housing laws is their general lack of any intent to employ the sanctions of police power in support of constructive programs such as those of public housing authorities and planning agencies This weakness is to be expected, for our pattern of housing regulation has been largely handed down from a time when there was no climate of constructive public policy for housing and city planning. Increased governmental aid on the constructive side, represented in the past few years by the public

[5] An act embodying substantially this principle, the so-called Minkoff Law, has been in force for several years in New York State Laws of New York 1938, ch. 678.

housing program and by Federal aid to planning bodies, has brought strong potential forces into play for the strengthening and broadening of police-power controls. If fully recognized and exploited, these forces may revolutionize our attitude toward law enforcement and the instruments under which it is carried out.

The development of official local housing standards coupled with sound appraisal techniques should warrant the drafting and testing in court of laws which provide that buildings and areas below a certain standard shall be taken out of housing use after a limited period allowed for amortization of any remaining economic value of the structures. Not only should such laws, if sustained, help in deflating speculative property values which have blocked the replanning of slum areas, but they would serve notice on communities as to the number of dwellings to be replaced by a given date. Local housing and planning bodies would thus be stimulated to more vigorous programming and search for funds. Furthermore, since the economic value of the worst buildings would presumably have been liquidated during the period of grace, it should be possible within a reasonable period to clear slums without payment for many of the structures. This is accepted practice in British slum clearance, and the lack of similar powers in America is estimated [6] to have cost our public housing program, in a typical year, over $400 per new dwelling unit built.

We must begin to think of comprehensive housing programs in which official designation of substandardness by areas will serve as a beacon to guide the agencies of reconstruction into those districts whose improvement under the police power may be hopeless, but which offer prime opportunity for private and governmental rehabilitation schemes, including housing projects as a basic form of public works.

In other words, imaginative exercise of restrictive powers may supply for the first time a method of earmarking whole districts so as to indicate both the relative urgency and the types of constructive programs needed for their improvement or rebuilding.[7]

4. *Post-war reconstruction of substandard urban areas.*– Official bodies and individual leaders in the fields of public administration, city planning, economics, and public health, concerned with the spread of detrimental housing conditions over large areas of our cities, recognize that constructive urban rehabilitation and replanning schemes on a vast scale are needed to cope with the steady physical

[6] William J Barron· Low Cost Housing and Slum Clearance Unpublished doctoral dissertation, Yale School of Law, 1941

[7] The paragraphs under topic 3 have been adapted from a forthcoming report of the Subcommittee on Housing Legislation and Administration of the Committee on the Hygiene of Housing, "Principles and Policies underlying the Elimination of Substandard Housing Conditions by the use of the Police Power."

and economic deterioration of central urban districts. Not only is it one of the democratic peace aims to provide shelter and environment which will promote healthful living for all families, but the execution of large-scale urban reconstruction projects immediately after the war is now being advocated by many economists as a primary type of public works to stabilize our post-war economy.[8]

The need for advance planning of local public works programs calls for early consideration of urban rehabilitation schemes by city administrations. Such planning is not different in kind from efficient day-to-day municipal administration, but is merely an extension of a constructive rehousing function that many cities have undertaken in recent years.

While the problem areas to be dealt with in post-war reconstruction are usually known in a general way, sound planning on the scale contemplated will require closer definition and measurement of substandard housing than is now employed, both to delimit the areas needing rehabilitation and to reveal the nature of remedies required. Good techniques for measuring the quality of houses and their neighborhood environment will supply many of the judgments needed in selecting slum-clearance sites, in considering the suitability of areas for continued housing use, and in determining possibilities for rehabilitation of existing structures.

Basic housing inventories conducted routinely under the inspection powers of law-enforcement agencies (and interpreted by them jointly with public housing and planning authorities) can be made to provide in a year or two the basic elements of long-range plans for critical areas. By utilizing the resources of permanent local agencies, these plans may be kept up-to-date, whatever the duration of the war, to be effectuated promptly at the end of it.

In view of the huge capital expenditures required at best for large-scale reconstruction, every effort must be made to reduce property acquisition costs to reasonable levels. Post-war programs should be able to operate with reference to legal standards which carry effective economic sanctions, to obviate the payment of public works funds for the purchase of dwellings maintained in gross violation of the law. Therefore local participation in Federal or State benefits under these programs might well be made conditional upon the development of adequate housing standards, systematic appraisal in problem areas, and effective legal means for bringing down the price to be paid for seriously defective houses.

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[8] See, for example, Guy Greer and Alvin H. Hansen: Urban Redevelopment and Housing, Planning Pamphlet No. 10, National Planning Association, Washington, D. C. December 1941.

[illegible] officers of Waterbury, New Haven, and Stamford, to whom thanks for their assistance in providing field personnel for the surveys needed to develop the subcommittee's appraisal technique. Special thanks are also due the Connecticut Department of Health, which contributed both the field services of its housing engineer and funds for analysis of certain field data.

The primary purpose of these demonstration surveys was to test the diagnostic value of the subcommittee's technique, and no effort has been made by the committee to secure adoption of the recommendations made in section III of the report with respect to the central substandard district. It is worthy of note, however, that the health department of the city concerned undertook on its own initiative to carry out several of the recommended steps as their desirability became apparent during the course of the survey.

A NOTE ON THE APPENDED SCHEDULE FORMS AND FURTHER DEVELOPMENT OF THE TECHNIQUE

Two field schedules are used, in the subcommittee's technique, to enumerate the characteristics of dwelling units and dwelling structures. The structure and premises schedule is filled out once for each building, whether containing one or more than one dwelling unit. This schedule is in the form of a folder, into which the dwelling unit schedules—one for each flat, apartment, or other unit in the structure—are slipped for filing.

The dwelling unit schedule is reproduced here in full, whereas for the structure schedule only the principal page for field entries can be shown. The portion omitted provides for entry of address and other structure-identification data, computed penalty scores, area covered by buildings, recorded legal violations, appraisal of fire hazards, and tax assessment and delinquency data. Space is also provided for photographs of the structure if desired. Items on physical and occupancy conditions are not segregated in the field schedules, but they appear as separate groups in the penalty rating column.

Omitted also is the block schedule, now in the experimental stage, which carries various environmental appraisal data and summarizes the character of housing in the block.

The subcommittee is now undertaking further demonstration surveys in cities where cooperation of law-enforcement and planning agencies is assured, with the primary purpose of finally developing the environmental appraisal portion of the technique. These further surveys will also make it possible to validate a revised penalty rating scale, check the total unit-cost of complete appraisals, and test the enumerators' instructions, tabulation plans, etc., to the point where these may be released, with the field schedules, for general use.

[illegible]—43—3

W.P.A. 1/42

HOUSING SURVEY • DWELLING UNIT City________ State________

Ward No.________ Premises No.________ Address________

Block No.________ Structure No.________ Floor________ Location________ Dwelling Unit No.________

A) OCCUPANCY:

- Vacant.................................. ☐
- Tenant-occupied......................... ☐
- Owner-occupied.......................... ☐
- Occupied by janitor or caretaker........ ☐

B) HEAD OF FAMILY:

Name________

White ☐ Negro ☐ Other________

Country of birth________

C) HOUSEHOLD COMPOSITION:

	MALE			FEMALE	
	Age	Rel		Age	Rel.
1			11		
2			12		
3			13		
4			14		
5			15		
6			16		
7			17		
8			18		

(Note: Encircle head of principal family)

Total No. of persons.. .... ________

No. of lodgers .... ________

Two or more man-wife families. .... Yes ☐ No ☐

D) RENT:

Rent..................... $______ per ______

If owner-occupied, estimated rent equivalent .... $______ per ______

Included in rent:

	Yes	No		Yes	No
Water....	☐	☐	Refrigerator	☐	☐
Heat........	☐	☐	Refr. fuel..	☐	☐
Hot water...	☐	☐	Cooking fuel	☐	☐
Light.......	☐	☐	Furniture...	☐	☐
			Garage......	☐	☐

E) INCOME:

Reported income of economic household for past 12 months:

- Under $600............................ ☐
- $600 but less than $1200.............. ☐
- $1200 but less than $1800............. ☐
- $1800 but less than $2400............. ☐
- $2400 and up.......................... ☐

No. of persons in economic household..________

F) OCCUPANT REPORTS:

	Yes	No
Leaks or obstructions in plumbing..	☐	☐
Low water pressure................	☐	☐
Infestation by rats...............	☐	☐
Dampness from walls or ceilings....	☐	☐

G) INSTALLED LIGHTING FACILITIES:

- Electricity......................... ☐
- Gas only............................ ☐
- None................................ ☐

H) INSTALLED HEATING EQUIPMENT:

- Central............................. ☐
- Local only.......................... ☐
- None................................ ☐

I) WATER SUPPLY:

- Piped in d.u.: hot and cold....... ☐
- Piped in d.u.: cold only.......... ☐
- Piped in structure only........... ☐
- Outside structure only............ ☐

J) BATHING FACILITIES

(Installed Tub or Shower):

Location:

- Inside dwelling unit............... ☐
- Inside structure only .... ☐
- Outside structure only............ ☐
- None on premises.................. ☐

Private to this d.u. ..... Yes ☐ No ☐

No. of d.u. sharing............ ______

	Yes	No
Facilities enclosed............	☐	☐
Piped hot water to tub or shower	☐	☐

K) TOILET FACILITIES:

Location:

- Inside dwelling unit..... ☐
- Inside structure only.... ☐
- Outside structure only... ☐
- None on premises......... ☐

Private to this d.u. Yes ☐ No ☐

No. of d.u. sharing.... ______

	Yes	No
Flush toilet..........	☐	☐
If flush toilet:		
In working order....	☐	☐
Toilet compartment enclosed..........	☐	☐
Window to outside air	☐	☐
Inst. wash basin in same compartment..	☐	☐

L) KITCHEN AND LAUNDRY FACILITIES:

	Yes	No
Inst. sink with running water......	☐	☐
Inst. range	☐	☐
Mechanical refrig. .	☐	☐
Ice-box..............	☐	☐
Inst. laundry tub in d.u. or structure..	☐	☐

M) ROOM FACILITIES:

Total No. of Rooms______	K	LR	DR	Bedrooms 1	2	3	4	5	Other
Rooms in d.u. (check)									
Window to outside (check)									
Heating installed (check)									
Closet built in (check)									
Room dimensions									
Computed area (office entry)									

N) INDICES OF DETERIORATION:

No.	Item	Deterioration None	Degree
1	Weak spots in floor, or ceiling sagging		
2	Floor surface missing or holes in floors		
3	Plaster missing		
4	Plaster loose		
5	Decorative finish missing or loose		
6	Window or door frames, trim, or sash deteriorated		

REMARKS ________

Enumerator________ Date________

FIELD SCHEDULE

[illegible] • STRUCTURE AND PREMISES • Structure No.________ [illegible]

1) LOCATION:

Frontage Boundary on Block Boundaries:

	Street Identification	Length in Ft.
a		
b		
c		
d		
e		
	Total	

Structure Location:

- Street ☐
- Alley ☐
- Rear yard ☐

2) LAND USE:

Land Use of Premises

- Dwellings exclusively ☐
- Hotel or lodging place ☐
- Mixed residential and business ☐
- Business or industrial ☐
- Public or semi-public ☐
- Unused land ☐

Describe all uses: ________

Structures on Premises

No.	Use and Type	Area (Office entry)

3) TYPE OF STRUCTURE:

Dwellings Exclusively:

- 1-family: detached ☐
  - semi-detached ☐
  - attached ☐
- 2-family: detached ☐
  - side by side ☐
  - other ☐
- 3-or-more-family: No. of d.u. ____
- Other dwelling place: No. of d.u. ____
- (specify) ________

Hotel or Lodging Place: No. of units ____

Mixed Residential and Other Uses

- No. of dwelling units ____
- No. of business units ____
- No. of rooming units ____

4) [illegible]:

- Available for occupancy ☐
- Under construction ☐
- Legally closed ☐
- Abandoned or vandalized ☐

5) STRUCTURAL CHARACTERISTICS:

Exterior Material

Wood ☐ Masonry ☐ Stucco ☐

Other ________

No. of stories ____

	Yes	No
Basement	☐	☐
Elevator (if more than 3 stories)	☐	☐

6) SERVICES REGULARLY PROVIDED BY LANDLORD (if 3-or-more-family structure):

	Yes	No
Public hall lighting	☐	☐
Public hall cleaning	☐	☐
Garbage and rubbish removal from dwelling units	☐	☐

7) SANITARY FACILITIES:

No. of flush toilets in str. but not in d.u. ____

No. of inst. baths in str. but not in d.u. ____

8) WATER SUPPLY:

	Yes	No
Public supply available	( )	( )
Premises connected to public supply	☐	☐
Private supply used or piped	☐	☐
Private supply acceptable	( )	( )
Water pressure adequate (transfer)	( )	( )

9) SEWAGE DISPOSAL:

	Yes	No
Sanitary sewer available	( )	( )
Premises connected to sanitary sewer or other water-carriage system	☐	☐
Privy on premises	☐	☐
Privy unacceptable	( )	( )
No justified complaints recorded during past two years	( )	( )

10) INDICES OF DETERIORATION:

	No.	Item	Deterioration: None	Deterioration: Marked
Exterior:	7	Exterior material deteriorated		
Main Staircases:	8	Steps deteriorated		
Public Halls (if 3-or-more-family):	9	Decorative finish missing or loose		
	10	Window or door frames, trim or sash deteriorated		
	11	Door panels broken or cracked		

11) DAYLIGHT OBSTRUCTION:

	This Structure: Number of windows	Adjacent Structures or Major Obstructions: Height (stories)	Dist. to (feet)	Overlaps [illegible]
Front				
Left side				
Right side				
Rear				

(Note: Encircle southerly side or sides)

12) SANITATION OF PREMISES:

	Yes	No	Remarks
Infestation by rats reported (transfer)	( )	( )	
Within floodable areas	( )	( )	
Evidence of stagnant water or poor drainage	☐	☐	
Hazardous condition of surface	☐	☐	
Refuse containers unacceptable	☐	☐	
Accumulation of garbage	☐	☐	
Accumulation of inflammable refuse	☐	☐	
Accumulation of other junk or rubbish	☐	☐	
Animals or poultry kept on premises	☐	☐	

GENERAL REMARKS: ________

Enumerator________ Date________

FIELD SCHEDULE

HISTOGENESIS AND REPAIR OF THE HEPATIC CIRRHOSIS IN RATS PRODUCED ON LOW PROTEIN DIETS AND PREVENTABLE WITH CHOLINE[1]

By R. D. Lillie, *Senior Surgeon*, L. L. Ashburn, *Passed Assistant Surgeon*, W. H. Sebrell, *Surgeon*, F. S. Daft, *Senior Biochemist*, and J. V. Lowry, *Passed Assistant Surgeon, United States Public Health Service*

In 1940 (*1*), we succeeded in producing a peculiar type of hepatic cirrhosis in rats by feeding a low protein diet and giving 20 percent alcohol or water to drink. Further experimentation has reduced the time necessary to produce such a cirrhosis to an average period of less than 3 months, some animals coming down in as little as 5 weeks. The details of the dietary experiments have been published elsewhere (*2*), the purpose of this paper being to set forth the anatomic and histologic details of the disease process and the apparent sequence of events in their development and in regeneration when the animals are placed on high protein or high choline diets.

The earliest evident change is the accumulation of fat globules of varying size in the liver cells, generally first about the hepatic venules, often irregularly, and later diffusely throughout the parenchyma. Larger fat globules tend to occur in the centrolobular areas, smaller droplets toward the portal areas. Somewhat after the appearance of the centrolobular fatty alterations, small globules of a peculiar hyaline basophilic substance appear.

To this material we are giving the name "ceroid" (κηρὸς=wax+εἶδος=form, appearance). This material occurs in fine to fairly large, round and oval globules up to 20μ in diameter. These hyaline globules stain deep to very pale blue green with eosin and polychrome methylene blue. They are often brownish orange rather than orange-red with sudan IV, and still stain in the same way with this dye in paraffin sections. However, the latter must be mounted in Apathy's syrup as are frozen sections, since exposure to such organic solvents as alcohol, acetone, and xylol promptly removes the stain. They contain no iron when the acid ferrocyanide test is applied, but the same phagocytes may occasionally contain hemosiderin between the hyaline globules which stain pink with the basic fuchsin counterstain. When stained with hot carbol fuchsin, decolorized with hydrochloric acid alcohol and counterstained with methylene blue, the hyaline globules are pink to deep red in color. Smaller isolated globules in liver cells stain the deepest red. Globules in the lungs are also usually deep red, while those in the spleen may be paler. It is our impression that staining by Ziehl Neelsen is more brilliant in biopsy material and in well preserved than in autolyzed tissue.

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[1] From the Divisions of Pathology and of Chemotherapy, National Institute of Health.

This ceroid apparently appears first as isolated fine droplets in liver cells, clearly so in non-fatty areas, less evidently, of course, in cells distended by large globules of fat. Only occasionally may these ceroid droplets be seen in liver cells only. Very promptly after its first appearance multiple globules of ceroid appear in phagocytes lying between the liver cell cords. These phagocytes are probably Kupffer cells. When they first appear these ceroid phagocytes are scattered irregularly, then tend to accumulate in the sheaths of the hepatic venules and in foci beneath the liver capsule. Later they form cellular strands proceeding in the midst of the centrolobular fatty areas, or through the now diffusely or irregularly fatty liver, to form trabeculae. These trabeculae proceed not only from the sheaths of hepatic veins and the capsule but also may abut on portal areas containing mature ducts and arterioles. As these primarily cellular trabeculae develop, delicate connective tissue fibrils appear among them, perhaps at first stainable only with silver or picroanilin blue, later staining with picro-acid fuchsin also. The connective tissue may increase greatly in amount so as to predominate in the trabeculae, or may remain inconspicuous. In addition to the dominant ceroid phagocytes, the trabeculae also enclose numbers of isolated necrotic or surviving liver cells, some of which possess compact cytoplasm, others being filled with fat globules. Small clumps of liver cells are also included Sometimes there are numerous slender, often double strands of narrow fusiform cells with leptochromatic nuclei which we are more inclined to interpret as proliferating capillaries than as ducts, as well as increased numbers of obvious bile ducts with cuboidal epithelium.

These trabeculae segregate small and large, angular and rounded nodules of fat-laden or fat-free liver cells. Ceroid globules still occasionally appear in liver cell cytoplasm and in clusters in phagocytic Kupffer cells. These segregated areas not infrequently contain apparently normal portal areas with duct, vein, and perhaps artery, even in advanced cirrhosis.

In places the trabeculae broaden out into bulky areas of replacement of hepatic parenchyma by a variably dense fibrillar connective tissue irregularly permeated by ceroid phagocytes, isolated and clumped liver cells, proliferating strands of slender fusiform cells, bile ducts, and small masses of liver tissue which may sometimes show diffuse interstitial infiltration by ceroid phagocytes and even fusiform fibroblasts. Also there are often numbers of apparently free fat globules staining solidly scarlet with sudan IV, or, not infrequently, as an orange-red rim of variable width about a central clear area. Similar pictures to the last are also seen in paraffin sections, the rim of lipoid material in this case staining blue-green with the Romanowsky and acid fast with Ziehl Neelsen. Occasionally there are also

numbers of multinucleate giant cells with their nuclei in a regular peripheral ring. Such replacement areas are of variable size, up to perhaps two-thirds of a lobe in extent. They occur more often near the hilus of the liver, near the ventral surfaces of lobes, and in ventral lobes, particularly the caudate lobes, but may sometimes occupy the free anterior margin of a lobe.

REPAIR CHANGES

Material for biopsy was taken from the livers of a number of animals on the cirrhosis-producing diet. Some of the animals were then put on a high protein diet and others were given a supplement of choline. A preliminary report of the results of this study has been published (3). The findings are given here because of their bearing on the histogenetic picture.

Following the biopsy, the animals died or were killed at intervals varying from 2 to 42 days. In the first 3 days there is a slight decrease in the amount of fat in liver cells. By the sixth day this change is prominent and in addition there is slight liver cell hyperplasia. In 16 to 18 days most livers show complete disappearance of this fat. However, in a very few livers it is present in very small amounts, usually as fine droplets, and in the vicinity of the trabeculae. Liver cells show marked increase in size, up to 50μ in diameter, have amphophilic granular cytoplasm, and larger and more deeply stained nuclei. Cells with more than one nucleus are present in moderate numbers and 5 or 6 nuclei per cell are occasionally seen; they are usually round to oval, but are rarely knobbed or incompletely lobated. Rarely a nucleus measures 25μ in diameter; however, a moderate number are present measuring 15μ. In contrast to the shrunken angular isolated cells in trabeculae seen in the untreated animals, they are often quite large, round to polygonal, and grouped to form sharply marginated hyperplastic nodules. Liver nodules, although still showing some irregularity of shape, have convex margins. This is most distinct where the hyperplastic trabeculated parenchyma borders on areas of fairly dense fibrous tissue replacement.

The amount, distribution, and density of the fibrous tissue, and the number and distribution of the ceroid phagocytes do not appear to be affected. A longer period of treatment will be necessary to determine the disposition of the phagocytes and to observe any possible alteration in the fibrous element.

OTHER ORGANS

Aside from the liver, the principal changes are the occurrence of ascites and hydrothorax in some of the animals with more advanced cirrhoses, and enlargement of the spleen.

The principal microscopic changes in the spleen are a reduction almost to the vanishing point of microscopically evident ferric iron in the pulp reticulo-endothelium in advanced cirrhoses, and the presence of a more or less pronounced sinus reticulo-endotheliosis with phagocytosis of variable quantities of ceroid. Ceroid globule accumulation is particularly prominent around the fibromuscular trabeculae but occurs throughout the pulp and also at times in swollen phagocytes within the often atrophic splenic follicles. When hemosiderosis is present at the same time, fine hemosiderin granules are often seen in the same cells between the larger, iron-negative, basophilic, ceroid globules. Even when the hepatic changes are only centrolobular fatty infiltration with scattered ceroid phagocytes, some of this material is often found in the spleen pulp.

Small abdominal (pancreatic and inter-renal) and peribronchial lymph nodes encountered in sections of the other viscera of animals with cirrhotic livers often show patches of sinus reticulo-endotheliosis with phagocytosis of variable numbers of ceroid globules.

Scattered ceroid phagocytes are seen also infrequently interstitially in the adrenal cortex, and more often in the solidly cellular marrow of the tibia and femur. In the lungs one often finds ceroid phagocytes in the septa where they often form small nodules, and in addition one finds larger, apparently free globules of acid-fast material within the septa.

Various degenerative changes were noted in the epithelium of the renal convoluted tubules, but as most of the animals were allowed to die and obvious autolytic changes were often present in other viscera, not much significance was attached to these. The acute nephrosis of choline deficiency was encountered in a few animals.

Altered blood was sometimes found in the stomach, and occasional mucosal hemorrhages and necroses were demonstrated. The significance of these is not clear at this time.

DISCUSSION

Among the more noteworthy features of the hepatic cirrhosis described are the absence of hemorrhages and, in the earlier stages, of evident necrotic liver cells, the absence of evident biliary obstruction even in the most advanced stages seen, the presence of ascites in some of the animals, the apparent centrolobular and interstitial origin of the trabeculation, and the constant presence of a peculiar acid-fast hyaline material, here designated as "ceroid," which apparently originates in liver cells, but is most abundant in phagocytes between cell cords especially in the trabeculae in the liver and in reticulo-endothelial phagocytes in the spleen, lymph nodes, and lungs.

This ceroid has been seen in some other experimental material in smaller amounts, and usually in association with low protein diets

[illegible] studied by [illegible] (7, 7) and also the hemorrhages and cell necrosis of selenium [illegible] were not present in the condition described here.

The dietary cirrhosis described by Rich and Hamilton (8) in rabbits differs from the foregoing in the absence of acid-fast hyaline material, in the apparently primarily periportal location of the proliferation, in the inconstancy of fatty changes in hepatic cells, in the frequent occurrence of biliary stasis, and in the frequency of hemosiderin pigmentation. The diet was similar to the diet of the present experiment in its low protein content.

The high fat plus alcohol and high fat diets of Connor and Chaikoff (9, 10) produced in dogs fatty livers with a primarily periportal fibrous trabeculation, or later, a diffuse fine trabeculation, not evidently perilobular or periportal, in which biliary stasis was evident.

Connor (11) also reports the production of hepatic cirrhosis in rabbits on a high protein diet by feeding alcohol. He describes in some animals a periportal and interlobular scarring with much duct proliferation, isolated single and clumped liver cells, and fairly regular trabeculation. Hyaline and fatty liver cells were common.

It is questionable whether the amount of "fibrosis" reported by György and Goldblatt (12) in their dietary liver necrosis constitutes a true hepatic cirrhosis. Certainly rats studied by us showing apparently the same centrolobular coagulative to hemorrhagic necrosis of the liver have shown no gradation of this process into clearly defined hepatic cirrhosis, although under certain, now well defined, dietary conditions, both processes may be seen in the same liver (unpublished data).

In von Glahn and Flinn's rabbits treated with lead arsenate (13), fibrosis was confined largely to portal areas and found only occasionally in interlobular areas. Lobulation remained regular, in contrast to the irregular trabeculation seen in the foregoing experimental cirrhoses or in human cirrhoses.

The cirrhosis produced in rats by Earle and Victor (14) by a low protein diet with 5 to 10 percent added cystine resembles that produced by selenium in similar diets in respect to cell necrosis, hemorrhages, and irregular trabeculation.

Various authors have worked with copper poisoning in rabbits. Among these Oshima and Siebert (15), Flinn and von Glahn (16), Herkel (17), Ellenberger and von Hofmeister (18), Polson (19), and [illegible] (20) saw no cirrhosis. [illegible] (21) reported [illegible] [illegible], necrosis, fat deposition, [illegible] connective tissue proliferation, and mixed iron-free and iron-positive pigmentation of

liver cells in various larger animals. Filehne (*22*) reported cirrhosis of periportal type in one rabbit; Adrianoff and Ansbacher (*23*) reported cirrhosis in 3 rats. Hall and Butt (*24*) produced pigmentation and some periportal fibrosis but no definite cirrhosis in a considerable number of rabbits, but no significant changes in rats, and later Hall and MacKay (*25*) produced pigmentation in 18 of 21 rabbits with cirrhosis in 9 of them, and none in 21 controls. Mallory and co-workers (*26-29*) had variable success in the production of pigment cirrhosis in rabbits and sheep, less in guinea pigs and rats.

This peculiar experimental hepatic cirrhosis of rats has no counterpart in the usually described varieties of hepatic cirrhosis in man. Careful restudy of 76 cases of cirrhosis and primary liver carcinoma with cirrhosis failed to reveal any cases which could be identified with the experimental condition. In no case was hyaline, basophilic and sudanophilic, acid-fast material identified in liver cells, Kupffer cells, or phagocytes.

CONCLUSIONS

In rats low protein, choline-poor diets produce a peculiar hepatic cirrhosis characterized particularly by fatty infiltration and by the appearance of a peculiar hyaline substance, designated as "ceroid," in liver cells and various phagocytic cells in the liver and in other viscera, notably spleen and lungs.

Correction of the major dietary defects results in quite prompt regression of the fatty changes, increases in size and, apparently, number of liver cells and persistence of the fibrous trabeculation and of the ceroid phagocytes.

This experimental cirrhosis is not identifiable with any of the previously described experimental toxogenic cirrhoses nor with any of the usual varieties of hepatic cirrhosis in man.

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DEATHS DURING WEEK ENDED MARCH 21, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Mar. 21, 1942	Corresponding week, 1941
Data from 87 large cities of the United States:		
Total deaths	8,836	9,008
Average for 3 prior years	9,046	
Total deaths, first 11 weeks of year	101,461	105,251
Deaths per 1,000 population, first 11 weeks of year, annual rate	12.9	13.4
Deaths under 1 year of age	545	536
Average for 3 prior years	512	
Deaths under 1 year of age, first 11 weeks of year	6,211	5,954
Data from industrial insurance companies:		
Policies in force	64,938,889	64,594,526
Number of death claims	13,541	13,208
Death claims per 1,000 policies in force, annual rate	10 9	10.7
Death claims per 1,000 policies, first 11 weeks of year, annual rate	10.3	11.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED MARCH 28, 1942

Summary

The current incidence of measles, meningococcus meningitis, and poliomyelitis and the cumulative figures for these diseases to date this year are above the 5-year (1937–41) medians for the corresponding periods.

The number of cases of meningococcus meningitis reported for the current week (90) is above that for any corresponding week since 1937. The largest numbers of cases and the highest case rates are reported from the New England, Middle Atlantic, South Atlantic, and Pacific States (New York 20 cases, Massachusetts 8, Pennsylvania 8, Maryland 6, and California 6).

Although the incidence of poliomyelitis is not alarmingly high (23 cases, widely distributed), it is above that for any corresponding week of the preceding 5 years. The total number of cases reported to date (289) is, however, below that for the corresponding period of both 1941 (293) and 1940 (311).

The incidence of both smallpox and typhoid fever for the current week is the lowest on record for the corresponding week. Of 19 cases of smallpox, the 4 West South Central States reported 10 (Texas 4, Arkansas, Louisiana, and Oklahoma 2 each).

Other reports include 2 cases of anthrax (1 each in Massachusetts and Pennsylvania), 17 cases of amebic dysentery (5 each in New York and Georgia), 72 cases of bacillary dysentery (33 in Texas, 15 in Georgia, 8 in Louisiana, 7 in New York), 43 cases of unspecified dysentery (22 in Arizona, 19 in Virginia), 1 case of Rocky Mountain spotted fever (in Wyoming), 14 cases of tularemia, and 37 cases of endemic typhus fever.

The crude death rate for the current week for 88 large cities in the United States is 12.5 per 1,000 population, as compared with 12.4 for the preceding week and 12.6 for the 3-year (1939–41) average.

Telegraphic morbidity reports from State health officers for the week ended March 28, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1936–41	Week ended—		Median 1936–41	Week ended—		Median 1936–41	Week ended—		Median 1936–41
	Mar 28, 1942	Mar 29, 1941		Mar 28, 1942	Mar 29, 1941		Mar 28 1942	Mar 29, 1941		Mar 28, 1942	Mar 29 1941	
NEW ENG												
Maine	1	1	2	2	1	13	151	41	41	1	0	0
New Hampshire	0	0	0	5	----	------	18	83	47	0	0	0
Vermont	0	0	0	--	-----	------	39	27	24	0	0	0
Massachusetts	1	2	3	----	-----	-------	929	787	782	8	3	3
Rhode Island	1	0	0	----	2	---	243	5	18	0	0	0
Connecticut	0	1	2	-----	8	8	518	126	134	2	1	0
MID ATL.												
New York	31	22	30	[1] 11	28	28	563	8,831	1,615	20	4	4
New Jersey	1	11	11	16	15	15	672	3,244	1,156	3	1	1
Pennsylvania	10	9	30		--	--	1,206	5,659	333	8	10	7
E NO CEN												
Ohio	12	7	7	14	16	16	260	7,818	238	0	2	2
Indiana	14	19	12	36	33	33	155	1,095	84	0	1	2
Illinois	29	34	33	35	94	94	741	4,497	82	2	0	1
Michigan [2]	6	11	11	3	28	6	232	5,896	318	2	1	2
Wisconsin	3	0	0	24	324	202	886	1,447	769	1	0	0
W NO CEN												
Minnesota	5	1	2	1	7	3	786	12	120	0	0	0
Iowa	4	6	2		71	9	395	270	169	0	0	0
Missouri	5	3	10	1	9	71	645	146	27	2	0	0
North Dakota	1	5	1	5		6	78	1	1	0	0	0
South Dakota	7	1	0	1	2	1	14	13	2	0	0	0
Nebraska	3	5	3	19			239	3	58	0	0	0
Kansas	2	8	7	12	13	13	608	1,133	434	0	1	1
SO ATL												
Delaware	0	0	0				7	337	24	0	0	0
Maryland [3]	1	4	4	8	176	28	632	393	393	6	0	1
Dist of Col	0	2	3	4	2	2	88	276	68	2	0	1
Virginia	6	14	12	524	441	441	298	2,547	427	4	5	5
West Virginia	4	9	9	67	29	118	280	612	19	2	3	3
North Carolina	8	12	20	68	59	59	1,028	1,600	1,313	2	3	3
South Carolina	3	5	5	435	713	713	259	598	32	2	0	1
Georgia	6	2	8	84	201	201	216	692	155	2	1	1
Florida	2	6	6	4	165	19	171	1,337	193	0	3	2
E SO CEN												
Kentucky	4	6	6	19	26	64	106	1,280	151	4	5	2
Tennessee	6	11	7	47	220	184	118	712	66	0	0	3
Alabama	5	4	12	228	883	883	495	829	210	4	4	4
Mississippi [2]	2	3	6				-	-	-	0	2	0
W SO CEN												
Arkansas	4	13	8	172	195	254	172	352	88	1	1	1
Louisiana	10	3	8		8	31	100	69	32	1	1	1
Oklahoma	7	2	7	143	201	97	264	44	48	0	1	1
Texas	85	84	84	1,049	1,173	1,166	2,914	1,825	518	2	2	2
MOUNTAIN												
Montana	3	0	1	14	10	40	53	44	60	0	0	0
Idaho	1	0	0	3	---	-	92	17	25	0	0	0
Wyoming	2	1	0	130	-		71	126	37	0	0	0
Colorado	10	10	9	56	48	11	238	363	234	0	0	0
New Mexico	1	3	3	18		1	13	342	68	0	0	0
Arizona	0	2	2	165	96	102	204	109	104	0	0	0
Utah [2]	0	1	0	39	18	13	266	31	127	0	0	0
Nevada	0	0	--	--	---	---	52	11	--	0	0	
PACIFIC												
Washington	1	3	1	5	13	13	291	40	40	3	1	0
Oregon	0	3	3	36	22	33	144	361	68	6	1	1
California	15	12	20	252	253	221	6,343	359	444	6	0	2
Total	272	311	380	3,755	5,603	5,603	24,293	56,440	15,779	90	57	57
12 weeks	3,814	3,619	6,208	57,885	459,538	139,399	182,906	319,867	152,500	842	594	683

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended March 28, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1936–41	Week ended—		Median 1936–41	Week ended—		Median 1936–41	Week ended—		Median 1936–
	Mar. 28, 1942	Mar. 29, 1941		Mar. 28, 1942	Mar. 29, 1941		Mar. 28, 1942	Mar. 29, 1941		Mar. 28, 1942	Mar. 29, 1941	
NEW ENG.												
Maine	0	0	0	20	5	17	0	0	0	0	0	1
New Hampshire	0	0	0	36	1	4	0	0	0	0	1	0
Vermont	0	0	0	5	16	10	0	0	0	0	0	0
Massachusetts	0	0	0	388	166	194	0	0	0	1	0	0
Rhode Island	0	0	0	16	7	17	0	0	0	0	0	0
Connecticut	0	0	0	41	71	108	0	0	0	1	0	1
MID. ATL.												
New York	2	0	0	545	640	994	0	0	0	4	10	9
New Jersey	0	1	0	174	346	225	0	0	0	1	1	1
Pennsylvania	0	0	0	603	400	548	0	0	0	7	7	7
E. NO. CEN.												
Ohio	0	0	1	261	297	339	0	2	3	2	1	2
Indiana	1	0	0	132	190	190	2	1	8	3	1	0
Illinois	2	1	2	311	512	592	1	7	7	1	3	3
Michigan [2]	1	1	0	284	396	508	1	0	12	2	2	2
Wisconsin	0	0	0	148	156	159	0	7	5	0	0	0
W. NO. CEN.												
Minnesota	0	0	0	95	63	97	0	3	7	1	0	1
Iowa	0	0	1	79	64	145	0	4	23	0	0	1
Missouri	1	1	0	125	40	109	2	17	22	1	1	2
North Dakota	1	0	0	23	9	9	0	0	3	0	0	0
South Dakota	0	0	0	46	10	13	0	0	1	0	0	0
Nebraska	0	0	0	54	55	41	0	0	3	0	0	0
Kansas	1	0	0	106	61	135	0	1	2	0	2	1
SO. ATL.												
Delaware	0	0	0	60	11	10	0	0	0	0	0	0
Maryland [2]	0	1	0	81	49	39	0	0	0	0	1	2
Dist. of Col.	0	0	0	13	14	16	0	0	0	0	2	0
Virginia	0	1	0	33	76	30	0	0	0	2	3	3
West Virginia	1	0	0	31	38	41	0	0	0	1	2	2
North Carolina	0	2	0	25	32	37	0	1	0	0	2	2
South Carolina	1	0	0	0	8	5	0	0	0	1	1	2
Georgia	1	0	0	10	9	9	0	0	1	6	3	3
Florida	0	2	1	1	6	8	0	0	0	5	8	2
E. SO. CEN.												
Kentucky	0	0	0	81	180	111	1	0	0	0	1	2
Tennessee	0	0	0	47	130	37	1	0	0	2	2	2
Alabama	2	2	1	18	25	18	0	0	1	4	3	3
Mississippi [2]	0	2	0	6	0	7	1	0	0	4	0	1
W. SO. CEN.												
Arkansas	0	0	0	2	7	8	2	0	1	1	5	5
Louisiana	0	0	0	1	5	11	2	1	1	2	2	6
Oklahoma	0	1	1	17	18	19	2	0	3	0	1	1
Texas	2	0	1	40	71	83	4	3	7	6	5	9
MOUNTAIN												
Montana	0	1	0	23	34	29	0	0	0	0	0	0
Idaho	0	1	0	6	7	14	0	0	1	0	0	0
Wyoming	0	0	0	9	20	16	0	0	0	0	0	0
Colorado	1	0	0	37	24	44	0	0	3	0	0	0
New Mexico	0	0	0	10	4	22	0	0	0	2	2	2
Arizona	0	0	0	8	9	9	0	0	0	0	0	0
Utah	0	0	0	42	11	12	0	0	0	0	0	0
Nevada	0	0		2	0		0	0		0	1	
PACIFIC												
Washington	1	0	0	53	12	32	0	1	1	1	0	0
Oregon	0	1	1	13	7	31	0	0	14	0	0	0
California	5	1	0	99	133	186	0	0	8	4	4	3
Total	23	19	19	4,260	4,465	5,416	19	48	270	65	77	95
12 weeks	289	293	255	48,344	44,579	63,907	290	928	3,654	907	904	1,308

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended March 28, 1942—Continued

Division and State	Whooping cough — Week ended— Mar. 28, 1942	Whooping cough — Week ended— Mar. 29, 1941	Week ended Mar. 28, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	43	54	0	0	0	0	0	0	0	0	0
New Hampshire	24	9	0	0	0	0	0	0	0	0	0
Vermont	47	27	0	0	0	0	0	0	0	0	0
Massachusetts	251	207	1	0	0	0	1	0	0	0	0
Rhode Island	49	19	0	0	0	0	0	0	0	0	0
Connecticut	72	67	0	0	1	0	0	0	0	0	0
MID. ATL.											
New York	455	334	0	5	7	0	0	0	0	0	1
New Jersey	236	98	0	0	0	0	0	0	0	0	0
Pennsylvania	211	430	1	0	0	0	1	0	0	0	0
E. NO. CEN.											
Ohio	195	322	0	0	0	0	0	0	0	0	1
Indiana	41	25	0	0	0	0	0	0	0	0	0
Illinois	194	95	0	1	0	0	2	0	0	2	0
Michigan [2]	201	427	0	2	5	0	0	0	0	0	0
Wisconsin	146	101	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	38	90	0	0	0	0	0	0	0	0	0
Iowa	19	49	0	0	0	0	0	0	0	0	0
Missouri	20	42	0	0	0	1	0	0	0	0	0
North Dakota	8	26	0	0	0	0	0	0	0	0	0
South Dakota	9	13	0	0	0	0	0	0	0	0	0
Nebraska	27	50	0	0	0	0	0	0	0	0	0
Kansas	32	119	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	3	7	0	0	0	0	0	0	0	0	0
Maryland [2]	42	80	0	0	0	1	1	0	0	0	0
Dist. of Col.	19	6	0	0	0	0	0	0	0	0	0
Virginia	23	99	0	0	0	19	0	0	0	1	0
West Virginia	48	134	0	0	0	0	0	0	0	0	0
North Carolina	152	307	0	0	0	0	0	0	0	0	0
South Carolina	57	159	0	0	0	0	0	0	0	0	1
Georgia	29	27	0	5	15	0	0	0	0	4	11
Florida	20	18	0	0	0	0	0	0	0	0	5
E. SO. CEN.											
Kentucky	105	82	0	0	1	0	0	0	0	1	0
Tennessee	23	78	0	0	0	0	0	0	0	0	0
Alabama	40	83	0	0	0	0	0	0	0	0	5
Mississippi [2]			0	0	0	0	0	0	0	0	0
W. SO. CEN.											
Arkansas	8	17	0	0	0	0	0	0	0	3	0
Louisiana	7	12	0	0	8	0	0	0	0	1	8
Oklahoma	22	81	0	0	0	0	0	0	0	0	0
Texas	187	322	0	3	33	0	0	0	0	0	5
MOUNTAIN											
Montana	5	9	0	0	0	0	0	0	0	0	0
Idaho	12	5	0	0	0	0	0	0	0	0	0
Wyoming	7	0	0	0	0	0	1	0	1	2	0
Colorado	18	94	0	0	0	0	0	0	0	0	0
New Mexico	11	31	0	0	0	0	0	0	0	0	0
Arizona	60	40	0	0	0	22	0	0	0	0	0
Utah [2]	44	90	0	0	0	0	0	0	0	0	0
Nevada	11	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	77	79	0	0	0	0	0	0	0	0	0
Oregon	18	9	0	0	0	0	0	0	0	0	0
California	319	564	0	1	2	0	3	0	0	0	0
Total	3,685	5,037	2	17	72	43	9	0	1	14	37
12 weeks	47,294	52,769									

[1] New York City only.

[2] Period ended earlier than Saturday.

CONSOLIDATED MONTHLY STATE MORBIDITY REPORTS FOR THE YEAR 1941

The figures in the following table are the totals of the monthly reports, and are therefore preliminary and incomplete. It is requested that each State include in the monthly reports all the diseases that are required to be reported in the State. Although the diseases required by law or regulation to be reported are not the same for each State, and other differences exist among the States with reference to the requirements regarding morbidity reporting, these consolidated reports have been found of value in presenting early information regarding the prevalence of a large group of diseases and in providing a comparison with similar figures for prior years.

	Actinomycosis	Chickenpox	Diphtheria	Dysentery, amebic	Dysentery, bacillary	Dysentery, undefined	Encephalitis, infectious	German measles	Hookworm disease	Influenza	Malaria	Measles	Meningitis, meningococcus	Mumps	Ophthalmia neonatorum	Pellagra	Pneumonia, all forms	Poliomyelitis
NEW ENG																		
Maine		2,716	11		1		1	1,085		4,372	1	4,645	9	2,199	1		516	41
New Hampshire		281	6	1				26		1,178	2	1,065	4	821	1		44	31
Vermont		1,470	27					1,598		403		1,355	1	1,574			38	14
Massachusetts	4	11,808	128	3	306		21	2,333			5	22,347	111	10,494	192	18	3,621	182
Rhode Island		1,364	82		3		5	178		433	2	604	6	287			319	37
Connecticut	1	5,922	36	6	103		3	1,448	1	4,914	10	6,998	25	5,581	2		2,811	115
MID ATL																		
New York		27,563	517	59	1,580		110	29,747			80	120,697	219		105		28,757	1,114
New Jersey		17,979	297	19	13		13	29,933		4,794	13	50,748	56	10,800	68		4,746	349
Pennsylvania		32,858	608	16	27		35	10,287		4	10	115,257	185	28,058	9	5	6,508	730
E NO CEN																		
Ohio		18,701	521	9	80		21	2,283		11,386	19	91,930	53	4,871	35	2	4,389	484
Indiana		3,295	540	2	1		6	885		2,762	18	16,614	36	1,145	1		896	116
Illinois	8	16,167	945	77	196		43	4,315	1	1,402	88	57,075	69	13,065	43	12	12,449	376
Michigan	7	19,219	238	36	254		8	4,230		1,819	29	70,748	49				4,348	270
Wisconsin		19,499	47	3			50	34		4,726	1	34,815	29	15,170			841	98
W NO CEN																		
Minnesota	21	5,835	138	38	16		543		3	4,658	4	948	18		2		1,303	288
Iowa	2	3,295	199	1	12	3	129	101		4,079	21	5,376	9	5,532		2	1,680	45
Missouri		2,272	300	2	9	92	8			1,339	59	7,824	29	863	1	3	2,116	40
North Dakota	2	1,561	84				1,089	34		1,096		1,471	3	601			1,039	17
South Dakota		507	164		2		197			75		413	7	556			282	28
Nebraska		1,020	92				53	4		187	1	429	1	536			59	13
Kansas		5,566	193	4	5		75	175		7,900	18	15,451	31	1,705		8	2,345	50

SO. ATL.																		
Delaware		608	26	1	1			24		150	1	4,073	3	148		1	86	26
Maryland		3,889	259	13	151	67	4	9,991		3,008	22	8,298	105	2,348	7	4	3,826	238
District of Columbia		1,091	74	4	2		1			849		4,434	13	389		2	1,097	76
Virginia		2,780	754	4	5,579					64,906	75	35,572	101	1,859		59	4,197	157
West Virginia		1,376	309		94		3			45 441	7	12,605	58	1,632		7	809	49
North Carolina		4,725	1,629		12			12,769		5,837	237	27,764	46			60	457	168
South Carolina		1,693	1,843	18			7	5,501	1,316	56,202	9,830	11,622	39	1,529	24	1,227	5,805	165
Georgia		1,190	710	52	330	29	12		6,938	35,150	1,065	10,831	21	1,079		169	2,247	735
Florida		925	223	48	16		3	1,400	9,122	3,963	141	11,224	25	665	6	37	1,140	278
E. SO. CEN.																		
Kentucky		3,127	360	7	335		5	1,305		22 291	25	20,656	73	6,992		10	1,105	220
Tennessee	1	1,868	486	16	264		5	2,288	23	20,743	476	9,545	74	2,458	16	122	4,590	538
Alabama		1,147	731	9			15	776		34,646	4,835	9,921	70	2,734	7	209	4,080	873
Mississippi		5,404	435	1,978	10,294				7,881	91,657	33,039	19,267	60	9,537	126	3,768	10,912	152
W. SO. CEN.																		
Arkansas		823	510	91	226		1	948	172	26,083	3,426	6,348	24	2,565	6	222	2,026	59
Louisiana		321	252	14	70		1		620	12,355	391	1,042	49	297	16	24	1,475	69
Oklahoma		736	412	19	281		14		16	14,298	1,911	2,401	19	1,036	9	50	2,609	49
Texas		7,506	1,902	341	3,198		92			128,372	8,068	23,221	86	7,421	94	1,612	10,037	123
MOUNTAIN																		
Montana	1	2,889	133	2	17		91	212		3,847	1	956	7	594			128	30
Idaho		653	22	1			2	73		1,218		536	3	474			52	10
Wyoming	1	1,043	58			2	30	86		9,676	2	1,440	9	312			276	12
Colorado		4,373	472	3	27		157			5,702	2	8,632	12	2,399			919	28
New Mexico		1,040	56	22	96	7	9	339		915	39	4,488	8	977		11	1,114	10
Arizona		1,268	130		79	1,260	32	378		7,861	41	4,009	6	1,534	8	79	1,649	15
Utah		5,529	34	4		1	5	2,508		5,512		1,087	5	1,907	1		429	41
Nevada		293	4	1			1			409		439	1	192			118	0
PACIFIC																		
Washington		7,159	65	7	21		46	11,268		1,329	8	1,857	26	8,337		1	361	76
Oregon		2,358	107	21	5		4			2,333	40	5,852	13	2,217		1	813	82
California	2	35,273	770	223	585		95	21,800		22,946	162	16,061	78	32,774	30		2,829	242
Total 1941	50	299,985	17,939	3,175	24,281	1,461	3,045	160,362	26,093	685,226	67,225	891,051	1,984	198,264	810	7,725	142,293	8,947
Total 1940	37	279,159	16,252	2,991	19,152	1,484	911	9,682	35,536	423,072	77,553	286,791	1,631	117,693	1,038	8,688	141,939	9,781
Median, 1936–40		272,472	28,551				911		30 940	277,826	82,123	297,378	2,638	145,620	2,142	9,301	127,933	7,281
Alaska		300	12					2,053		5,860		534	6	223			175	5
Hawaii	1	897	107	22	144		4	835	75	467	3	3,026	1	182			163	34

[1] Reports for 6 months only.

CONSOLIDATED MONTHLY STATE MORBIDITY REPORTS FOR THE YEAR 1941—Continued

	Puerperal septicemia	Rabies in animals	Rabies in man	Rocky Mountain spotted fever	Scarlet fever	Septic sore throat	Smallpox	Tetanus	Trachoma	Trichinosis	Tuberculosis, respiratory	Tuberculosis, all forms	Tularemia	Typhoid and paratyphoid fever	Typhus fever	Undulant fever	Vincent's infection	Whooping cough
NEW ENG.																		
Maine					390	17		2		2	412	621		31		32	37	1,222
New Hampshire					229	17						194		13		27		393
Vermont					298	2					20	103		24		62	63	622
Massachusetts		32		1	7,164	171		19	19	45	3,266	3,595	1	145	1	87		9,792
Rhode Island		6			435	98					465	2,130		12		11	3	1,465
Connecticut		1			1,758	241		4	1	12	1,276	1,339	2	49	1	126		2,857
MID ATL.																		
New York		131	1	9	14,851	810		59		193	14,090	15,235	2	517	44	289	556	18,164
New Jersey		305		5	7,796	140		11	5	31		3,566	1	121	3	58		6,775
Pennsylvania	1		2	11	10,903			8	4	7		2,297	29	467	3	64		16,010
E. NO. CEN.																		
Ohio	13		6	10	9,778	135	22	10	10	46	5,075	5,297	208	353	2	115		15,211
Indiana		19		6	4,261	6	49		5		1,419	1,431	88	112		24	1	1,221
Illinois		350	1	17	11,605	86	102	32	284	12	8,178	9,460	109	296	1	218	206	7,709
Michigan	1	62	1		8,747	1,176	114	13	89	11		5,371	42	212	2	142	172	16,512
Wisconsin					5,067	80	157		2			1,092	25	42	1	130		9,392
W. NO. CEN.																		
Minnesota		15			2,316	111	129	8	7	8		2,036	22	27		162		3,711
Iowa		45		14	1,910	192	114	2			552	552	30	93		354		1,737
Missouri		1		13	3,333	114	137	4	494			2,379	60	216		32		1,989
North Dakota				1	313	22	10	1	2		286	316	16	17		7	56	925
South Dakota				6	709	20	68	1	26			239	5	16		9		602
Nebraska					844	9	10				5	176		21		5		682
Kansas		20			2,338	90	36	7	4		767	850	31	77	5	91	134	5,039
SO. ATL.																		
Delaware		10	1	6	596						179	179		12		1		276
Maryland		1		43	1,983	279		18		1	2,944	3,047	14	228	3	30	224	3,499
District of Columbia				4	596						1,901	1,986	2	33	1	3		736
Virginia				34	1,753	2,596		7	12		2,704	2,704	36	378	17	16		4,289
West Virginia			1	7	1,940	103	5					1,893	13	232		7		2,220
North Carolina				20	2,166	139	4		2		2,001	2,426	22	209	78	12	85	10,934
South Carolina		278	1	1	429	50	10	33				701	7	254	105	11		5,020
Georgia	2		2	3	1,062	534	11	11	3	3		1,775	65	380	927	122		1,254
Florida					204	10		7		1		989	2	178	192	21	70	754

E. SO. CEN.																		
Kentucky				9	3,733	390	24		86		1,721	1,749	120	410	1	20		3,477
Tennessee	5		3	10	3,197	332	26	22	37	5		3,556	62	387	45	27	85	2,652
Alabama		169	1	1	1,180		9	31	1			2,824	16	170	299	45		1,663
Mississippi	271	5		1	480		31		67		1,339	1,383	38	199	83	34		9,272
W. SO. CEN.																		
Arkansas	9	259	1	2	349	1,015	36	9	1,908	1	993	1,051	97	331	4	22		1,168
Louisiana	1	43		1	290	125	9	24	2		1,349	1,349	29	400	196	64	1	391
Oklahoma			1	13	810	745	32	4	1,166	4		1,732	43	213	2	108	101	937
Texas		69		1	2,061		47		148			2,840	46	815	733	330		11,012
MOUNTAIN																		
Montana				98	1,046	97	4		12	1		438	33	26		11	4	1,069
Idaho	1			10	350	16	8		1		32	32	5	22		10	16	632
Wyoming				90	310	35	2		5			76	70	17		13	1	408
Colorado				23	1,102	43	41				860	860	5	97		36		5,065
New Mexico	11	125	2		231	39	4	2	7		918	960	3	113		8		1,179
Arizona					212	20	23		800			1,257		42	2	22		1,231
Utah				12	383	69	1		25		147	177	44	28		11		2,726
Nevada				4	30	1	2		1			68	4	15		2	13	266
PACIFIC																		
Washington		64		6	1,148	45	31	3	28	1	1,568	1,777	4	82		41	35	4,959
Oregon		42		11	411	50	45		7			620	11	72		19	76	1,060
California		442	1	2	5,341	85	15	74	156	80	9,197	9,644	20	281	29	319		21,328
Total 1941	315	2,494	25	505	128,518	10,345	1,368	426	5,426	464	63,664	106,372	1,482	8,485	2,780	3,408	1,939	281,590
Total 1940	427	2,761	31	417	155,707	10,198	2,764	412	4,489	521	57,245	103,348	1,641	9,658	1,879	3,358	2,167	183,278
Median 1936–40	427			380	183,893		9,738			331	56,406	103,718	1,641	13,767	1,879	3,358		183,278
Alaska					8	112					672	731		10		1	7	70
Hawaii					20	1		24	6	21		779		74	81	6		477

Anthrax: Vermont, 1; Massachusetts, 7; New York, 17; New Jersey, 10; Pennsylvania, 38; Iowa, 2; Missouri, 1; South Dakota, 1; Delaware, 3; District of Columbia, 1; West Virginia, 1; North Carolina, 1, Florida, 1, Louisiana, 3; Texas, 6, Arizona, 1, Oregon, 1, California, 1

Botulism. Illinois, 1; North Dakota, 3; New Mexico, 1; California, 17.

Colorado tick fever: Wyoming, 8; Colorado, 7.

Dengue. South Carolina, 30; Florida, 1; Alabama, 3; Mississippi, 14; Arkansas, 1; Louisiana, 25; Oklahoma, 1; Texas, 526, Arizona, 7, California, 1

Diarrhea: Ohio, (under 2 years) 1,297, Michigan, (infant diarrhea) 61; Maryland, 281; South Carolina, 11,500; New Mexico (enteritis included) 147; Nevada (infant diarrhea) 18; California (epidemic diarrhea of newborn) 36.

Enteritis: Kansas, 5; New Mexico (diarrhea included) 147; Washington, 115 (under 2 years, 52; over 2 years, 63); Alaska, 15.

Food poisoning: Ohio, 13; Illinois, 31; Kansas, 7; Louisiana, 27; New Mexico, 9; Nevada, 4, Washington, 4, California, 714.

Granuloma, coccidioidal: California, 39.

Leprosy: Rhode Island, 1, New York, 4; Pennsylvania, 1; Minnesota, 1; Florida, 2; Mississippi, 1, Louisiana, 12; Texas, 14; Wyoming, 1, Washington, 1; California, 11: Hawaii Territory, 31.

Plague, human: California, 2.

Psittacosis: Connecticut, 1, New York, 4; Pennsylvania, 1; Ohio, 1; Illinois, 1; District of Columbia, 1, Florida (suspected) 1; California, 2

Weil's disease: Michigan, 29; Maryland, 5; Washington, 17; Hawaii Territory, 7.

WEEKLY REPORTS FROM CITIES

City reports for week ended March 14, 1942

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	32	3	0	0	10	0	2	0	0	1
Baltimore, Md	1	1	6	0	395	1	27	0	26	0	0	25
Billings, Mont	0	0	-----	0	0	0	1	0	0	0	0	0
Birmingham, Ala	0	0	13	1	2	1	6	0	4	0	0	4
Boise, Idaho	0	0	-----	0	0	0	0	0	0	0	0	0
Boston, Mass	2	0	-----	0	120	0	15	0	123	0	0	42
Bridgeport, Conn	0	0	-----	0	14	0	4	0	2	0	0	0
Brunswick, Ga	0	0	-----	0	24	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	1	0	6	0	20	0	18	0	0	4
Camden, N J	0	0	-----	0	9	0	3	0	15	0	0	1
Charleston, S. C	0	0	38	1	0	0	2	0	1	0	0	1
Chicago, Ill	2	0	6	0	104	0	31	0	123	0	0	91
Cincinnati, Ohio	0	0	-----	4	5	0	10	0	22	0	0	15
Cleveland, Ohio	1	0	9	0	8	0	8	0	75	0	2	19
Columbus, Ohio	2	0	1	1	15	0	5	0	5	0	0	1
Concord, N H	0	0	-----	0	0	0	3	0	2	0	0	0
Cumberland, Md	0	0	-----	0	0	1	1	0	2	0	0	0
Dallas, Tex	3	0	-----	0	266	0	10	0	5	0	0	3
Denver, Colo	3	0	20	0	114	0	4	0	11	0	0	6
Detroit, Mich	6	0	2	1	85	1	21	0	145	0	0	40
Duluth, Minn	0	0	-----	0	2	0	1	0	14	0	0	0
Fall River, Mass	0	0	-----	0	10	0	2	0	53	0	0	0
Fargo, N Dak	0	0	-----	0	1	0	1	0	0	0	0	0
Flint, Mich	0	0	-----	1	5	0	3	0	1	0	0	2
Fort Wayne, Ind	0	0	-----	0	1	0	3	0	1	0	0	0
Frederick, Md	0	0	-----	0	7	0	0	0	0	0	0	0
Galveston, Tex	0	0	-----	0	0	0	2	0	0	0	0	0
Grand Rapids, Mich	0	0	-----	1	10	0	3	0	1	0	0	4
Great Falls, Mont	0	0	-----	0	41	0	0	0	0	1	0	1
Hartford, Conn	0	0	-----	0	32	0	0	0	1	0	1	2
Helena, Mont	0	0	-----	0	0	0	0	0	0	0	0	3
Houston, Tex	2	0	-----	0	84	0	8	0	4	0	0	3
Indianapolis, Ind	1	0	-----	1	25	0	10	0	26	0	0	11
Kansas City, Mo	0	0	-----	0	29	0	7	0	33	0	0	6
Kenosha, Wis	0	0	-----	0	1	0	0	0	1	0	0	7
Little Rock, Ark	0	0	7	0	146	0	2	0	0	0	0	1
Los Angeles, Calif	3	0	18	2	447	0	24	1	28	0	0	23
Lynchburg, Va	0	0	-----	0	0	0	2	0	0	0	0	8
Memphis, Tenn	0	0	4	1	9	0	9	0	7	1	1	5
Milwaukee, Wis	0	0	-----	0	84	0	0	0	34	0	0	37
Minneapolis, Minn	0	0	-----	0	119	0	9	0	25	0	0	15
Missoula, Mont	0	0	-----	0	0	1	0	0	1	0	0	0
Mobile, Ala	1	0	-----	1	5	0	6	0	1	0	0	0
Nashville, Tenn	0	0	-----	1	0	0	5	0	2	0	0	7
Newark, N J	0	0	2	0	101	1	4	0	25	0	0	28
New Haven, Conn	0	0	1	0	134	0	1	0	4	0	0	8
New Orleans, La	0	0	1	1	0	1	16	0	6	0	1	0
New York, N Y	26	1	12	5	40	8	80	1	296	0	3	241
Omaha, Nebr	2	0	-----	0	78	0	3	0	5	0	0	0
Philadelphia, Pa	2	0	7	3	23	0	27	0	304	0	2	52
Pittsburgh, Pa	1	0	3	1	21	0	21	0	10	0	2	9
Portland, Maine	0	0	-----	0	12	2	2	0	1	0	0	1
Providence, R I	0	0	-----	0	181	0	2	0	6	0	0	38
Pueblo, Colo	0	0	-----	0	17	0	0	0	2	0	0	8
Racine, Wis	0	0	-----	0	4	0	2	0	1	0	0	11
Raleigh, N C	0	0	-----	0	1	0	0	0	1	0	0	0
Reading, Pa	1	0	-----	0	10	0	0	0	3	0	0	7
Richmond, Va	1	0	2	2	2	0	5	0	6	0	0	0

City reports for week ended March 14, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va	0	0	--	0	0	0	2	0	0	0	0	0
Rochester, N Y	0	0	-----	0	6	0	2	0	9	0	0	13
Sacramento, Calif	2	0	------	0	115	0	2	0	0	0	0	9
St Joseph, Mo	0	0	---	0	8	0	3	0	1	0	0	0
St Louis, Mo	0	0	-	0	204	0	8	0	28	0	1	6
St. Paul, Minn	0	0	--	0	493	0	6	0	8	0	0	27
Salt Lake City, Utah	0	0		1	17	0	1	0	3	0	0	21
San Antonio, Tex	0	0	5	2	18	0	7	0	1	0	0	1
San Francisco, Calif	2	0		0	152	0	5	0	12	0	0	0
Savannah, Ga	0	0	34	4	34	0	2	0	2	0	0	0
Seattle, Wash	0	0		0	10	2	10	0	2	0	0	36
Shreveport La	1	0	2	0	6	0	6	0	0	0	0	0
South Bend, Ind	0	0		0	1	0	0	0	30	0	0	4
Spokane, Wash	0	0	--	1	6	0	2	0	2	0	0	3
Springfield, Ill	0	0		0	159	0	4	0	0	0	0	0
Springfield, Mass	0	0		0	25	0	5	0	13	0	0	13
Superior, Wis	0	0		0	1	0	0	0	1	0	0	0
Syracuse, N Y	0	0		0	33	0	2	0	14	0	0	42
Tampa, Fla	0	0	2	2	5	0	0	0	1	0	1	2
Terre Haute, Ind	0	0	-	0	0	0	1	0	0	0	0	0
Topeka, Kans	0	0		0	3	0	0	0	7	0	0	3
Trenton, N J	0	0	1	0	2	0	4	0	10	0	0	13
Washington, D C	0	0	2	0	51	2	17	0	16	0	0	26
Wheeling, W Va	0	0		0	32	1	4	0	2	0	0	1
Wichita, Kans	0	0	1	0	23	0	5	0	3	0	0	3
Wilmington, Del	0	0		0	0	0	6	0	10	0	0	0
Wilmington N C	0	0		0	116	0	6	0	0	0	0	0
Winston-Salem N C	0	0	1	0	64	0	1	0	1	0	0	0
Worcester, Mass	0	0		0	24	0	6	0	7	0	0	61

Dysentery, amebic —Cases New York, 2 St Louis, 1, San Francisco, 1
Dysentery, bacillary —Cases Los Angeles, 4
Typhus fever —Cases Charleston, S C, 1, New York, 1

Rates (annual basis) per 100,000 population for the group of 87 cities in the preceding table (estimated population, 1942, 33,901,316)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
Week ended Mar 14, 1942	10 00	35 84	6 31	685.52	85.82	256 40	0 31	2 15	165 34
Average for week 1937–41	17 54	98 12	16 46	1227 38	113 80	280 53	4 19	4 03	177 29

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended February 28, 1942.—During the week ended February 28, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	---	3	2	---	5	---	1	1	2	14
Chickenpox	---	19	41	103	308	57	33	40	127	728
Diphtheria	---	8	---	13	6	3	2	---	8	40
Dysentery	---	---	---	7	---	---	---	---	---	7
German measles	---	2	---	---	72	13	27	5	50	169
Influenza		19	---		21	4	34	---	14	92
Measles	1	24	---	203	124	212	73	22	20	679
Mumps	3	11	---	403	332	114	276	74	396	1,609
Pneumonia		12	---		15	1		---	49	77
Poliomyelitis					1					1
Scarlet fever	8	15	11	77	307	57	75	64	29	643
Tuberculosis	2	4	10	60	46	---	2			124
Typhoid and paratyphoid fever			3	21			---	---	1	25
Undulant fever			1	2	3		---		2	8
Whooping cough		21	---	72	76	3	---	2	19	193
Other communicable diseases		7		3	218	26	17	1	5	277

COSTA RICA

Notifiable diseases—January 1942.—During the month of January 1942, certain notifiable diseases were reported in Costa Rica as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chickenpox	1	---	Scarlet fever	1	---
Diphtheria	24	---	Typhoid and paratyphoid fever	17	1
Measles	13	---	Whooping cough	17	---

MALTA

Notifiable diseases—December 1941.—During the month of December 1941, certain notifiable diseases were reported in the island of Malta, including the island of Gozo, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cancer		26	Nephritis		2
Cerebrospinal meningitis	2	1	Pneumonia	30	5
Chickenpox	3	---	Puerperal fever	6	---
Diabetes mellitus	---	19	Scarlet fever	1	---
Diarrhea and enteritis (under 2 years of age)		34	Tetanus		1
Diphtheria	31	6	Trachoma	70	---
Dysentery		1	Tuberculosis (respiratory system)		11
Erysipelas	6	1	Typhoid fever	25	7
Gastroenteritis		51	Undulant fever	33	1
Influenza	13	---	Whooping cough	25	1
Measles	2	---			

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

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STUDIES OF THE ACUTE DIARRHEAL DISEASES[1]

VI. NEW PROCEDURES IN BACTERIOLOGICAL DIAGNOSIS

By ALBERT V. HARDY, *Surgeon* (R), JAMES WATT, *Passed Assistant Surgeon*, and THELMA DECAPITO, *Junior Bacteriologist, United States Public Health Service*

The first paper of this series called attention to the superiority of the more highly selective culture media for the isolation of *Shigella dysenteriae* (*1*). We reported that the addition of one plate of desoxycholate-citrate to three plates of less selective media increased the isolations by 75 percent in cases, and by 314 percent in carriers. Irons and associates (*2*), Coleman (*3*), Mayfield and Gober (*4*), and Anderson and Cruickshank (*5*) have reported confirmation of our findings as to the efficacy of highly selective media.

We have, in the course of other studies, continued to evaluate culture media. Since January 1940, we have used continuously a new preparation, S. S. (Shigella-Salmonella) agar, first as an experimental medium submitted for trial, and later as purchased in the open market. The comparative efficiency of this and the desoxycholate-citrate medium in the culturing of fecal specimens collected in three widely separated areas is shown in table 1. Both preparations provided excellent results, but consistently the newer S. S. agar yielded a significantly greater number of positive isolations than the desoxycholate-citrate medium. Butterfield and Burns[2] report that freshly isolated Shiga strains grew luxuriantly on S. S. agar but that colonies on the desoxycholate-citrate could be seen only with the aid of a hand lens.

The full value of either of these highly selective media is obtained only when the whole surface is inoculated with the maximum amount of fecal material which will yield isolated colonies. The inoculum may be smeared quite freely on these preparations. Specimens submitted in glycerine-saline preservative are plated with a 24- or 26-gage nichrome needle bent so the terminal 1 cm. will be flat on the

[1] From the Division of Infectious Diseases, National Institute of Health, and the DeLamar Institute of Public Health, Columbia University

[2] Personal communication from C. T. Butterfield and W. E Burns

surface of the medium when the handle is at a convenient working angle. The whole surface is seeded and the amount of inoculum varied by streaking in two to four segments. Cultures obtained with a rectal swab as described below are plated by "painting" the entire surface with the feces-coated swab.

TABLE 1.—*The relative effectiveness of desoxycholate-citrate and S. S. agars in isolating Shigella dysenteriae from fecal specimens*

Variety of *Shigella*	Total positives	Number and percent of total isolations from specified media									
		D C [1] and S S [2]		D C only		S S only		Total D C.		Total S S.	
		Number	Percent	Number	Per cent	Number	Percent	Number	Percent	Number	Percent
Flexner	328	204	62	44	13	80	25	248	76	284	87
Newcastle	72	38	53	12	17	22	30	50	69	60	83
Sonne	278	177	64	39	14	62	22	216	78	239	86
Total	678	419	62	95	14	164	24	514	76	583	86

[1] Desoxycholate-citrate medium
[2] S S (Shigella-Salmonella) agar

A high proportion of the colonies are differentiated most clearly after 18 to 24 hours' incubation, but some, particularly on the desoxycholate-citrate agar, develop more slowly. Colonies having the characteristics of pathogenic organisms at 18 to 24 hours may become slightly pink, especially on the S. S. agar, after further incubation. For these reasons, we pick all plates after 18 to 24 hours and reexamine on the following morning. The clear, colorless colonies are readily seen on a satisfactory plate. If the medium has become cloudy, as it does with the growth of organisms occasionally present in feces, the size, shape, and transparency of the colonies must be considered. We make liberal use of Krumwiede's triple sugar agar to provide the preliminary differentiation of organisms giving suspicious colonies. In picking it must be remembered that a heavy inoculum is placed on these media. The growth of most nonpathogens is inhibited but they may remain viable. The inoculated surface must be regarded as a contaminated surface. Selected colonies are picked by merely touching the elevated center with the needle, not by a "scooping" motion. Cultures so picked are rarely, and never heavily, contaminated. This does not significantly confuse the reading of the reaction in Krumwiede's medium. However, all cultures should be plated for purity before proceeding with the detailed cultural and serological studies.

The need for a simplified procedure for obtaining fecal cultures became apparent in our study of institutional inmates. A rectal swab technique devised for these groups has been found to be more widely applicable.

It is difficult and painful to insert a dry sterile swab past the anal sphincter; it is easy and painless to insert a small, lubricated rubber tube. The method which we have adopted is to insert the dry swab contained within the lumen of the lubricated tube. The necessary materials are inexpensive and readily available. Gum rubber tubing (0.5 cm. inside and 0.8 cm. outside diameter) is purchased in bulk and cut into 12 cm. lengths. One end is beveled for about 1 cm. Cotton swabs are prepared on the usual wooden applicators but the cotton must be wound tightly, the end covered completely, and it must pass readily into the lumen of the tube. For use the swab is placed in the rubber tube with its tip slightly short of the beginning of the beveled opening. The external surface of this end of the tube is lubricated. The jelly should not reach the swab nor cover the opening. With the patient in a convenient position the unit is very easily inserted past the sphincter and up about one-half the length of the tube. The swab is exposed by withdrawing the tube 2 to 3 cm. The specimen is collected by rotating the applicator while sweeping it in a circular motion. The swab is then drawn back into the tube and in this position removed from the patient. The rubber tube and swab are separated and the latter is immediately used for plating, as described above. Later the tubes are boiled, washed, sterilized, and stored for future use. One precaution must be observed in collecting specimens from individuals with a watery diarrhea; the rubber tube must be compressed between the fingers to prevent an undesired discharge of fecal material.

We have used this method of obtaining cultures extensively in the study of institutional inmates. The specimens may be obtained as desired and the culture medium is inoculated with no delay whatsoever. It is also a rapid procedure. Two workers, with the assistance of available attendants, can readily obtain and plate 100 to 125 specimens per hour. Rectal swabs are convenient for hospitalized cases and have been used for the study of men in military barracks. Nurses may be permitted to collect specimens in this way from individuals ill at home. The limitations of the method are determined chiefly by the psychological reactions of the patients and the convenience of the workers concerned.

The highly selective culture media and this rectal swab technique for obtaining cultures have simplified our bacteriological studies, made it possible to expand our work, and have increased the proportion of positive observations.

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STUDIES OF THE ACUTE DIARRHEAL DISEASES [1]

VII. CARRIERS OF *SHIGELLA DYSENTERIAE*

By JAMES WATT, *Passed Assistant Surgeon,* ALBERT V. HARDY, *Surgeon* (R), and THELMA M. DECAPITO, *Junior Bacteriologist, United States Public Health Service*

Evidence concerning carriers of *Shigella dysenteriae* has been obtained in various ways during our studies. The complete description of these investigations will be presented in subsequent papers. At present certain data are being reported because recent advances in chemotherapy have demonstrated their practical importance in control.

The essential elements of our bacteriological procedures have been stated in previous papers of this series. The development of the highly selective desoxycholate-citrate and S. S. (Shigella-Salmonella) agars made it possible to obtain more dependable evidence concerning carriers of *Shigella dysenteriae*. Without these media, carriers of these organisms would be identified rarely; with them, they can be found frequently and with relative ease.

The designation "convalescent carrier" is used for individuals who harbor *Shigella* following recovery from an illness known to be due to this cause or following a diarrheal illness not known to be due to any other cause. The relationship between the infection and the disease was accepted only if the carrier was recognized within 3 months after the termination of the illness, but, once identified, the person was considered to be a convalescent carrier up to 1 year after recovery if the same variety of *Shigella* was harbored. "Passive carrier" signifies a culturally positive individual who had no history of diarrheal disease within the 3 months preceding the date of the first positive test or if, when an attack had occurred, the illness was proved to be other than *Shigella* infection. The term "chronic carrier" is used, as in typhoid, for any carrier state known to have continued for more than 1 year.

[1] From the Division of Infectious Diseases, National Institute of Health, with the cooperation of the departments of public health of those areas in which the studies were conducted, the Indian Medical Service, and the DeLamar Institute of Public Health, Columbia University.

CONVALESCENT CARRIERS

During 1938 in New Mexico, serial stool cultures during illness and after recovery were obtained from 103 culturally proved cases of bacillary dysentery. Routinely specimens were collected at weekly intervals until the individual had three consecutive negative examinations. Almost all of these patients were at home and there were inevitable breaks in the prescribed routine. However, the presence or absence of the convalescent carrier state was determined in all, and its approximate duration in all but 9 of the proved carriers. There are certain recognized limitations to these data. The duration of illness and convalescence could not be fixed with certainty. The best estimate determined by careful questioning was used. The collection of specimens depended on the voluntary cooperation of the families concerned, and weekly cultures were the most that could be obtained. Measurement of the period of infection by these relatively infrequent examinations gives an average interval shorter than the actual duration. Furthermore, in this series, 9 cases which had been followed for several weeks were still positive when the study terminated or when they ceased to provide specimens.

In this group of 103 positive cases, 82 (80 percent) convalescent carriers were found. The remaining 21 (20 percent) had positive cultures during illness only. The absence of infection after recovery was well established in 5 cases by negative tests in the final days of illness or in the early days after recovery. Follow-up specimens were not collected from the remaining 16 until 7 to 14 days after recovery. Probably at least some of these were carriers during the first week after recovery, thus increasing even beyond 80 percent the total percentage of convalescent carriers.

The duration of infection with symptoms and after recovery is shown in table 1. For all cases, the average duration of infection with symptoms was 11 days and the average minimum duration of infection after recovery 27 days. Known convalescent carrier states continued for an average of 34 days. The total period of illness was about equally divided between the time of acute symptoms and that of subsidence to complete recovery. Thus the duration of the convalescent carrier state was approximately 6 times as long as the acute stage of the illness and about 3 times as long as total illness.

The average length of illness due to Flexner infection was more prolonged than that due to Sonne or Newcastle, as were the periods of infection after recovery.

Table 2 shows the variation in the persistence of the convalescent carrier state for the different organisms. It was more common for infections with both Newcastle and Sonne to terminate in the first week after recovery than was true of Flexner types. The duration

beyond this varied widely with no significant difference by type of organism.

TABLE 1.—*Frequency of occurrence of the convalescent carrier state in proved cases of Shigella dysenteriae infection with a comparison of the duration of infection in illness and after recovery*

Observation	Variety of *Shigella*			
	Flexner	Newcastle	Sonne	Total
Cases				
Studied by serial cultures	57	28	18	103
Became convalescent carriers:				
Number	45	21	16	82
Percent	79	75	89	80
Did not become convalescent carriers	12	7	2	21
Duration of carrier state determined	38	20	15	73
Duration of carrier state unknown	7	1	1	9
Duration of *Shigella* infection:				
With symptoms				
Total days	758	191	137	1,086
Average per case	13	7	8	11
After recovery				
Total days	1,584	549	375	2,508
Average per case [1]	32	20	22	27
Average per known carrier	42	27	25	34

[1] Exclusive of those in which the duration of the carrier state was unknown.

The frequency of the convalescent carrier state was further shown by findings on 163 other positive cases in New Mexico in 1938 which were not followed by serial cultures. One or more cultural examinations were made during the month following recovery and 110 (67 percent) were found to be carriers.

TABLE 2.—*Persistence of the convalescent carrier states, by variety of Shigella*

Week after recovery	Number and percentage of convalescent carriers positive during and later than the specified period							
	Variety of *Shigella*						Total	
	Flexner		Newcastle		Sonne			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1	38	100	20	100	15	100	73	100
2	32	84	10	50	9	60	51	70
3	30	79	8	40	7	47	45	62
4	25	66	8	40	6	40	39	53
5	22	58	6	30	4	27	32	44
6	17	45	6	30	2	13	25	34
7	15	39	5	25	2	13	22	30
8	15	39	3	15	2	13	20	27
9	11	29	2	10	1	7	14	19
10	9	24	2	10	1	7	12	16
Over 10	4	11	2	10	1	7	7	10

These data show that convalescent carriers occur commonly and that individuals recovered from diarrheal disease may continue to disseminate the infection for days, weeks, or even months.

PASSIVE CARRIERS

Evidence concerning passive carriers was obtained by survey examinations of general population groups and of institutional inmates. Records concerning present and past diarrheal disorders were secured when the specimens were collected. The data as to clinical disease for individuals found culturally positive were checked by the medical epidemiologist during the completion of a detailed epidemiological report.

A total of 6,324 survey examinations were performed in New Mexico, Georgia, and Puerto Rico on individuals who stated that they had had no diarrheal disorder during the preceding year and 239 (3.8 percent) were positive for *Shigella dysenteriae* (table 3). The proportion was low in individuals under 1 year of age when almost all infections resulted in illness. It was fairly high during ages 3 to 9, but the striking feature of the age distribution was the relative uniformity of the passive carrier rates above the first year. There were variations by locality, by season, and by sex, as will be shown in the subsequent detailed report. The findings for these three regions were in marked contrast to those in New York City, where only 2 (0.1 percent) carriers were found among 1,659 persons examined.

TABLE 3.—*Prevalence of passive carriers of Shigella dysenteriae in healthy population groups with no history of diarrhea in the preceding year. Surveys made in New Mexico, Georgia, and Puerto Rico*

Age	Cultural examinations	Positive for *Shigella dysenteriae*		Age	Cultural examinations	Positive for *Shigella dysenteriae*	
		Number	Percent			Number	Percent
Under 1	328	2	0.6	20–24	471	23	4.9
1	136	6	4.4	25–34	818	20	2.4
2	183	7	3.8	35–44	621	20	3.2
3	200	12	6.0	45 and over	833	18	2.2
4	180	13	7.2	Unknown	302	4	1.3
5–9	1,076	73	6.8				
10–14	733	26	3.5	Total	6,324	239	3.8
15–19	443	15	3.4				

The occurrence of carriers among other population groups was studied as follows: (1) For 20 months cultures were made every 2 weeks on all members of a study group averaging 243 feeble-minded inmates. The prevalence of carriers varied from none to a maximum of 22 percent. Many individuals became infected more than once. In all, 312 infections were discovered in individuals who were and had been free of clinical disease due to *Shigella dysenteriae* for at least 3 months, a rate of 77 "carrier infections" per 100 inmates per annum. (2) In other institutions in which diarrheal disorders were occurring relatively high carrier rates were found. (3) Family contacts of positive cases had particularly high rates as, for example, 28 percent

passive carriers in New Mexico in 1937. (4) Similar data were obtained in the investigation of endemic diarrheal disease in a small military unit. Ten percent of the men who were on duty and officially well were culturally positive.

CHRONIC CARRIERS

Our investigations have been conducted in four widely separated and differing regions and we obtained only limited information concerning chronic carriers. Cases diagnosed in New Mexico in 1937 and retested in the summer of 1938 gave no evidence of prolonged carrier states. One patient in an institution was followed for more than a year before she ceased to discharge *Shigella*. Other persons are known to have had recurrent attacks with the same variety of organism for more than 1 year. These individuals have been exceptional cases in our experience. This fact, combined with evidence that this infection can be maintained by a constantly changing group of infected individuals, indicates that chronic carriers are of little importance in the spread of *Shigella dysenteriae*.

IDENTIFICATION AND CONTROL OF CARRIERS

It was found repeatedly that carriers outnumbered currently occurring cases. Thus the importance of carriers in the dissemination of infection is apparent. The practical significance of this information depends upon the practicability of their identification and control.

Approximately two-thirds of all *Shigella dysenteriae* infections found through our surveys were current or recent cases or household contacts of cases of diarrhea. During the seasonal peak of diarrheal disorders an even greater proportion (five-sixths) of carriers were found in families giving a history of diarrhea. Carriers may be discovered through effective diagnostic examinations of clinical cases and of their household or other intimate contacts. A program for the cultural examination of cases and contacts would be practicable for general population groups with adequate medical and public health services. Comparable procedures could be applied readily in institutions or military units. The ease of obtaining cultures from such controlled population groups would more than counterbalance the necessity of testing substantial numbers of contacts.

The high prevalence of carriers and the frequently prolonged duration of this infection make it impracticable to effect control by isolation until spontaneous bacteriological recovery. Recently the problem of control has been simplified by chemotherapy. Now *Shigella dysenteriae* infections in both the individual and in groups can be terminated promptly. Data leading to this conclusion are presented in chapter VIII, which follows.

CONCLUSION

Convalescent and passive carriers of *Shigella dysenteriae* occur commonly. A large proportion of them may be identified with relative ease if cases of diarrheal disease and their contacts are promptly studied by the use of the new highly selective culture media.

STUDIES OF THE ACUTE DIARRHEAL DISEASES [1]

VIII. SULFAGUANIDINE IN THE CONTROL OF *SHIGELLA DYSENTERIAE* INFECTIONS

By Albert V. Hardy, *Surgeon* (R), and James Watt, *Passed Assistant Surgeon, United States Public Health Service; Jerome Peterson, Epidemiologist*, and Elise Schlosser, *Bacteriologist, Puerto Rico Department of Health*

Marshall and coworkers, Lyons, Suarez and Hernandez, and Anderson and Cruikshank (*1, 2, 3, 4*) have reported on the use of sulfaguanidine in the treatment of bacillary dysentery. Our experience has provided evidence in support of their conclusions that this is a promising therapeutic agent. In known positive cases treated with sulfaguanidine the promptness of bacteriological recovery was particularly impressive. It seemed possible that carriers would respond to similar treatment. If they did the implications for control were apparent. Thus our observations, as reported here, were designed primarily to determine the possible value of sulfaguanidine in the control of *Shigella dysenteriae* infections.

OBSERVATIONS

Most of the individuals whom we have treated were inmates of a mental hospital. Clinical cases of *Shigella dysenteriae* infection were found by bacteriological examination of individuals with diarrhea; carriers were identified by cultural surveys. Most of the cases and all of the carriers admitted to the study were cultured daily for 3 days before the beginning of treatment, and all were tested daily throughout the period of treatment. Follow-up examinations were performed for at least 1 week and usually for 2 weeks thereafter. Cultures were taken by the rectal swab technique described in chapter VI of this series. Cases or carriers were included in the analysis if positive on the day treatment was initiated, or on the following day; carriers were included only if, in addition to the above, they had two or more positive cultures among the three pre-treatment examinations and the one on the morning treatment was started. In the controlled series alternate cases or carriers were given the drug.

[1] From the Division of Infectious Diseases, National Institute of Health, and the Insular Department of Public Health, San Juan, P. R.

Later, with the objective of eradicating the infection from the group, all culturally positive individuals were treated.

It is clearly apparent in table 1 that the infections (in this series due to either the Flexner or Newcastle variety of *Shigella*) were cut short by treatment. Seventy-six percent of the controls remained positive throughout the 10 days of observation shown in the table; during the next 10 days, when most of the patients were examined daily, 6 more became culturally negative. From the known variation in the duration of *Shigella* infections, it is estimated that the remainder gradually ceased to be positive during the following 2 or 3 months. In marked contrast, the last positive finding in the treated alternates was on the tenth day, and there was little persisting infection after the fifth day. The organisms were found regularly in one clinical case up to the seventh day; this case was again positive on the tenth day. A carrier was shown as infected up to the eighth day. His first four cultures were all positive but after the first day of treatment the organisms were found only on the eighth day.

TABLE 1.—*The persistence of Shigella dysenteriae infection in untreated controls and in individuals treated with sulfaguanidine*

Days after beginning treatment	Number and percent of individuals with continuing positive infections											
	Untreated controls				Treated alternates				Uncontrolled treated series		Total treated	
	Cases	Carriers	Total		Cases	Carriers	Total		Number	Percent	Number	Percent
			Number	Percent			Number	Percent				
0	11	18	29	100	13	15	28	100	40	100	68	100
1	9	17	26	90	10	9	19	68	30	75	49	72
2	9	17	26	90	4	3	7	25	17	42	24	35
3	9	17	26	90	2	2	4	14	5	13	9	13
4	9	16	25	86	2	2	4	14	2	5	6	9
5	9	16	25	86	2	1	3	11	2	5	5	7
6	9	16	25	86	1	1	2	7	1	3	3	4
7	9	16	25	86	1	1	2	7	0	0	2	3
8	9	15	24	83	1	1	2	7	0	0	2	3
9	8	14	22	76	1	0	1	4	0	0	1	1
10	8	14	22	76	1	0	1	4	0	0	1	1

This wide variation in the number of continuing positive individuals does not adequately indicate the even more marked difference in the quantity of organisms being discharged. After treatment there was a prompt and striking reduction in the number of suspicious colonies even before the individual became negative. The cultures on the untreated controls usually continued to show large numbers of typical colonies.

The post-treatment stool cultures in this series did not reveal any recurrence of infection.

The uncontrolled treated series included 3 acute and 5 chronic clinical cases and 32 passive carriers. These responded promptly to

treatment. The latest positive culture (from a chronic clinical case) was obtained 6 days after the beginning of treatment.

Having determined that sulfaguanidine would terminate *Shigella dysenteriae* (Flexner and Newcastle) infection in the individual, we then examined the possibility of eradicating it from heavily infected groups. Two adjoining wards of the mental hospital were used for this test. Infected persons were found by culturing 380 of the male inmates. From these the study group of 205 inmates was selected with an approximate ratio of 1 infected to 4 noninfected persons. No general measures of control were instituted and the conditions as they existed were favorable for the spread of infection. Cultures were taken daily on every individual. Treatment of those known to be infected was started on the evening of the fourth day. Others who subsequently yielded organisms giving a positive reaction on Krumwiede's medium were immediately placed under treatment. Sulfaguanidine was given in 5-gram doses 3 times daily for 4 days. Treatment was extended for a longer period if the cultures continued to yield suspicious organisms.

TABLE 2.—*The occurrence of Shigella dysenteriae infection among 205 inmates of a mental hospital, as related to treatment with sulfaguanidine*

Date	Treatment status	Individuals culturally positive			Known infected individuals		
		Infected when admitted to study	Infected after admission to study	Total	Infected when admitted to study	Infected after admission to study	Total
Aug. 25	Pre-treatment	30	0	30	43	0	43
26		38	0	38	46	0	46
27		31	2	33	41	2	43
28[1]		32	5	37	35	6	41
Aug. 29	All known positive cases treated	21	6	27	26	6	32
30		13	3	16	15	4	19
31		5	5	10	5	6	11
Sept. 1		0	6	6	2	6	8
2		2	3	5	2	3	5
3		1	5	6	1	5	6
4		0	3	3	0	4	4
5		0	2	2	0	2	2
6		0	0	0	0	0	0
Sept. 8	Post-treatment	0	1	1	0	1	1
11		0	2	2	0	2	2

[1] Treatment started after cultures were obtained.

The result of this procedure is shown in table 2. All individuals having positive cultures on the survey examination (on August 21) or on one or both of the first two routine daily cultures have been classified as infected on admission to the study. Those negative on these 3 tests but subsequently positive have been classified as infected after admission to the study. Two persons positive on the survey examination had 5 and 7 negative cultures, respectively, before they were again positive. They have been included with the group infected after entering the study. Individuals when positive frequently

yielded the organisms on each daily culture until they became negative. However, several had positive observations interrupted by a single negative finding and 5 cases had 2 consecutive negative cultures in a series of positive tests. Thus the number of infected persons was usually greater than the number of positive cultures on any one day.

Sulfaguanidine was first given on the evening of August 28. After 5 doses the number of positive cultures and of infected individuals was reduced by more than 50 percent, as shown by the findings on August 30. After 3 days, those infected on admission to the study were almost free of infection. The two individuals who remained positive for 2 and 3 days longer were discharging relatively few organisms. On the ninth day after sulfaguanidine was started all individuals had negative cultures. Treatments were discontinued the next day.

Two follow-up examinations were conducted on both wards during the subsequent week. Three positive cultures, as shown in table 2, were found. Previously these persons had been consistently negative. Individuals in one of the two wards were examined 3 more times during the week but no additional positives were discovered. The source of these later infections is uncertain. The attendants were neither examined nor treated. Nearby wards had, concurrently, active cases of bacillary dysentery. Flies caught in these rooms and cultured were found positive for *Shigella dysenteriae*. Screens were lacking. Furthermore, it is possible that one or more in the study group who were culturally negative may nevertheless have been discharging and distributing *Shigella*. Whatever the source of these infections, the treatment rapidly reduced the prevalence of *Shigella dysenteriae*. Had there been no reintroduction it may have successfully eradicated it from the group.

A simplified procedure was used in a military unit in which endemic diarrheal disorders had been persistently annoying. The reported cases were in the hospital. Most of the other men were examined twice before treatment. There were 29 positive cultures in the 291 examinations, a carrier prevalence rate of 10 percent. All persons with positive or suspicious organisms were treated. The subsequent 105 follow-up examinations revealed only 1 infected individual. This man developed mild symptoms (which he did not report) on the day treatment was started. Morbidity reports were not available but, according to the medical officer in charge, the diarrheal disorders which had previously been prevalent disappeared after treatment.

The most recent trial of sulfaguanidine in the control of *Shigella* infections was in an institution for feeble-minded in New York State. During a period of study which continued for 20 months *Shigella dysenteriae* (Sonne) gained entrance and spread widely in each of two groups being observed. The populations averaged 120 and 123,

respectively. Cultural surveys every 2 weeks revealed a persistence of this infection in the groups for 9 and 15 months after it was first discovered. The study was terminated at that time, but 9 months later follow-up examinations were conducted and Sonne infection was still present. There had been no recent illnesses in one group and 1 carrier only was found. Endemic diarrhea persisted in the other and 2 positive cases and 3 carriers were discovered. Those with positive cultures were transferred to the hospital and, under treatment, became and remained negative. All other members of the group have had at least 3 consecutive negative tests. It is believed, therefore, that the infection in the groups was terminated by chemotherapy.

The dosage of sulfaguanidine which we have used has varied but has not been less than 0.3 gm. per kilogram per day for at least 4 days. We have not observed any toxic reactions with even larger doses or more prolonged treatment. At present we are seeking to determine the minimum effective dosage.

Up to the present time we have treated only 6 individuals with Sonne infections, and for these there were no controls. All became culturally negative but only after an average interval which was longer than that in Flexner or Newcastle infections. The effect of sulfaguanidine in the latter infections appears to be well established but our conclusion with respect to Sonne is, at present, guarded. Further evaluation of this treatment in cases or carriers should give attention to the variety of *Shigella* concerned.

COMMENT

General sanitary measures have in the course of years reduced the incidence of infectious diarrheal diseases, which have been found to be predominantly *Shigella dysenteriae* infections. Because these methods of control must be general they can be applied only slowly. Furthermore, under certain conditions they are not effective. The two groups of mentally defective children which we studied lived under excellent institutional conditions. The sanitary quality of the water, milk, and food was carefully guarded, the sewage disposal facilities were modern, and there was close attention to environmental and personal cleanliness. The average annual morbidity from acute diarrhea during the period of 20 months was about 50 percent. The minimum total infection rate for *Shigella dysenteriae* as determined by survey cultures every 2 weeks was approximately one attack per inmate per annum. Clearly the general methods of control were ineffective. The high incidence of secondary infections among household contacts and on hospital wards illustrates further the ability of this infection to spread from person to person even in a "protected" sanitary environment. Under these conditions specific preventive measures are needed.

The wide distribution of these infections at the present time is not generally recognized. Data obtained in appropriate surveys of the general population indicated that the annual attack rate for acute diarrhea, mild or severe, was as high as 50 percent in some communities in New Mexico and Puerto Rico and 20 percent in Georgia. It was found to be very low in New York City. Fecal cultures of clinical cases in New Mexico and Georgia when first examined before convalescence yielded *Shigella dysenteriae* in 75 percent of the severe diarrheal diseases and in 58 percent of the milder disorders. The study in Puerto Rico, where the reported mortality from the diarrheal diseases is very high, has indicated that there are probably more than 100 deaths from *Shigella* infection per 100,000 population per annum. Even in New York City the bacteriological examination of children admitted with acute diarrhea to public pediatric wards frequently revealed positive cases. Where cases were occurring the prevalence of convalescent and passive carriers also was found to be high, as reported in chapter VII.

We did not find in this series any *Shigella* infection which was resistant to sulfaguanidine, but these do occur occasionally. One of us (J. W.) in subsequent studies found a carrier who continued to discharge large numbers of organisms despite the administration of 330 grams of the drug during 22 days of treatment. Suarez and Hernandez (*3*) also reported a case which remained culturally positive, but this person was given only 33 grams *per os* in 4 days and subsequently 55 grams by retention enemas in 7 days.

Chemotherapeutic agents other than sulfaguanidine have not been evaluated as yet. The preliminary report of Poth and Knotts (*5*) on the activity of succinyl sulfathiazole in the bowel is promising. Other sulfonamides have been tried with stated benefit in clinical cases of bacillary dysentery. Comparative studies of chemotherapeutic agents in *Shigella* infections are needed and have been started. Eventually it should be possible to select the most desirable agent on the basis of efficiency, toxicity, and cost.

A practical program for specific control can be determined only through experience but certain conditions make the outlook favorable: (*a*) These preventive measures are most needed in groups readily subject to control, as institutional inmates, men subject to military orders, or families with an infectious enteric disease involving some member, usually a child. (*b*) The individuals most likely to spread infection will be those discharging many organisms. These will be discovered readily by the use of one of the new selective media. The light infections, not so easily identified, will often terminate spontaneously within a short period of time. (*c*) Large numbers of specimens may be obtained with ease in many of the groups which will need to be examined through the use of the rectal swab technique

described in chapter VI. (*d*) Those who are ill will seek or welcome a treatment which will relieve symptoms as it terminates the infection. Carriers who are usually in contact with known cases will not object to a similar medication which is easy to take and does not give rise to unpleasant reactions.

CONCLUSION

The use of chemotherapy in the control of *Shigella dysenteriae* infections has given promising results and warrants adequate trial.

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SULFADIAZINE IN MURINE PERTUSSIS [1]

By JOHN W. HORNIBROOK, *Passed Assistant Surgeon, United States Public Health Service*

Several writers (*1*, *2*, *3*) have indicated that the sulfonamides (sulfapyridine, sulfanilamide, and proseptazine) are of value in the prevention and treatment of pneumonia following whooping cough

The use of sulfonamides in experimental pertussis in animals is disappointing. Gross (*4*), using intraperitoneal injections of live organisms in mice, found that death was not prevented by the use of sulfanilamide, 4,4′-di (acetylamino) diphenyl sulfone or 4,4′-diaminobenzenesulfonanilide. Cruickshank (*5*) and Bradford and Wold (*6*) injected the organisms intranasally and found that sulfanilamide and sulfapyridine did not prevent death.

By using a modification of the technique of North (*7*) it has been found at the National Institute of Health that sulfadiazine is effective in experimental pertussis.

METHOD

A saline suspension of a 24-hour culture of *H. pertussis* grown on Bordet Gengou medium is made up to a turbidity of 400 parts per million of silica. This is then diluted 1:2500. Mice are anesthetized

[1] From the Division of Infectious Diseases, National Institute of Health.

with ether and 0.05 cc. of the suspension is dropped in the nose. The inoculation is repeated in one-half to one hour to insure a more uniform distribution of the inoculum in all the mice. At the end of 6 to 9 days the mice are killed with ether, the ventral surface painted with alcohol and an incision made in the neck with a small scalpel. The incision is carried through the trachea and a 24-gauge nicrome wire inserted and pushed down into the lungs. The wire is then streaked on a slant of B. G. medium, incubated 3 days, and examined for *H. pertussis* colonies. The knife is wiped with an alcohol sponge after each operation and the wire is flamed. With a little practice 15 or 20 mice may be cultured in an hour.

The drugs were given subcutaneously in a dose of 0.02 gm. daily. An equal number of treated and control mice were always used.

In recording results, slants with 100 or more colonies were considered positive and slants with less, negative. Grossly contaminated cultures were not counted one way or another.

RESULTS

When the first dose of sulfadiazine was given 1 hour before inoculation the cultures from 19 of 20 mice were negative (1 contaminated). However, 10 of 14 controls were positive.

This experiment, when repeated twice with groups of 10 mice, resulted in essentially the same result.

Tests with sulfaguanidine and sulfathiazole indicate that they were possibly less effective than sulfadiazine. Sulfanilamide appears to be ineffective under these conditions.

When sulfadiazine was started 3 days after inoculation and the mice were killed 7 days after inoculation, no significant reduction in the number of positive cultures resulted. However, when the test animals were cultured on the ninth day after inoculation, only 1 of 10 was positive and all 10 of the controls were positive. Contents of the control tubes were all confluent or semiconfluent, while the sulfadiazine tubes averaged only 35 colonies per mouse.

CONCLUSION

Sulfadiazine reduces the number of *H. pertussis* organisms recoverable on culture from the mouse lung.

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ADMINISTRATIVE ORGANIZATION FOR MENTAL HYGIENE [1]

By VICTOR H. VOGEL, *Passed Assistant Surgeon, United States Public Health Service*

The State has traditionally been responsible for the institutional care of the mentally ill, but it has not kept pace with newer knowledge in efforts to prevent the occurrence of mental illness or its progression to the point where more or less permanent hospitalization is necessary.

It is time to ask ourselves as public health physicians why everything possible is not being done to control this type of illness. It is time to ask ourselves as taxpayers if the problem of the mentally ill is being handled as economically as possible. Many of our mental hospitals are operated as custodial rather than as therapeutic institutions. Most cases entering State hospitals do so without ever having received any preventive attention or early care. This is not good medicine and this is not good common sense unless psychiatry and its handmaiden, mental hygiene, are unable to give assistance (*1*).

Is there a technique which can be economically applied to the problem? There is, and, since it concerns a matter of health, public health agencies should apply it. I refer to the community mental hygiene clinic with accompanying educational and research activities. With mental and emotional disorders furnishing one-half of all disability it is important that each community should have a mental hygiene center where preventive information is disseminated and where early assistance may be obtained. In the field of mental disorders it is impossible and unnecessary to differentiate strictly between prevention and early treatment. Treatment of the behavior problem at the child level may be prevention at the institutional level, and, since institutional care is a State responsibility, the prevention of institutionalization is logically a State interest.

It is difficult to demonstrate statistically that the educational efforts which comprise "pure" mental hygiene prevent the development of mental disorders, or that children seen in mental hygiene clinics would have become, as adults, patients in mental hospitals. It is easier to show that some children are prevented from going to correctional institutions by the efforts of the mental hygiene clinic.

[1] Presented at the first session of the Health Officers' Section, 70th Annual Meeting of the American Public Health Association, October 14, 1941.

It is fairly well established now that at least one-third of all the problems presented to the better child guidance clinics are solved and that another third are improved. Every commitment prevented to a correctional or mental institution probably saves the State $5,000. If this is accomplished in three cases a year, the budget of a mental hygiene clinic is saved.

It was estimated a few years ago in Indiana that if that State's system of community mental hygiene services were extended to cover the entire State, from 15 to 20 percent of patients treated, who would under ordinary circumstances be committed, would not become institutional cases, thus saving the State approximately $583,000 each year. It is estimated that this State could save an additional $284,000 annually by the discharge of approximately 15 percent of the institutional cases if adequate mental hygiene clinics existed for parole supervision (*2*). Two brief case histories from the Indiana service are presented.

Case 1594.—This patient, a 33-year-old housemaid, was referred to the clinic because of extreme nervousness, depression, and mild paranoid ideas. Shortly before coming to the clinic she had been divorced by her husband to whom she had been married for 10 years.

It was the feeling of the referring agency, as well as the psychiatrist, that this patient was progressing rapidly to a mental state which would require commitment and institutional care.

The history shows the patient to have been reared in a home with a step-father and a hostile, rejecting mother who made a particular favorite of the patient's brother. As a child, the patient recalls that she was always contrasted unfavorably with the brother, that she was timid and sensitive, unable to feel part of a group, and never sure of herself. She married rather suddenly a man she had known but a few weeks. After the honeymoon the marital relationship grew progressively more unhappy. The patient was unable to respond to her husband's sexual advances. Finally, the patient ran away with another man who shortly thereafter deserted her.

The examination showed an extremely tense, anxious woman with a depressed mood, a tendency to suspiciousness, and with definite suicidal thoughts. There was evidence of an extreme feeling of guilt and a strong, self-punishing drive.

The patient was treated in the clinic over a period of 4 or 5 months. During this time she released considerable emotion, worked through many of her childhood conflicts, and emerged from treatment a much happier and more stable individual who was able to get and hold a good position much above the level of work she had been doing.

Case 2062.—This patient, a 16-year-old boy, was referred to the clinic because he seemed to be losing interest in his environment, was withdrawing and preoccupied with many rather fantastic ideas having to do with the salvation of the world.

The history showed that this boy was reared by his mother, the father having died shortly after his birth. About 6 months prior to his appearance at the clinic, the boy had been the leader of a very aggressive gang of youngsters who had committed wholesale robberies as well as destroyed property over a rather wide area. The boy had been placed in a detention home for a few months before his symptoms made their appearance.

On examination the boy was found to be extremely apathetic. His eyes had a fixed, glassy look. He talked only in monosyllables and at times his attention seemed miles away from the interview. His thoughts were chiefly concerned with the invention of a perpetual motion machine through which the misfortunes of mankind could be alleviated. The boy had built up in his mind a fantasy of himself as almost a second Messiah. One was able to discern the extreme hostility and feelings of guilt beneath the surface which were the chief factors in producing his acts of delinquent behavior and regressional symptoms. It was the psychiatrist's opinion that this boy was becoming schizophrenic.

A treatment plan was worked out involving removal from the mother and placement in a boarding home in the country. The boy was given intensive psychiatric treatment over a period of 4 or 5 months. He made progressive improvement and worked through a number of his conflicts, and, when discharged from further attendance at the clinic, was functioning in all respects as a happy, normal young man with success in his school and social activities.

This boy would have required institutional care before very long, had not clinic intervention occurred, and it is probable that without the more intensive psychiatric treatment available in the clinic, his placement in an institution would have caused a progressive deterioration.

The good that mental hygiene clinics do is not limited to cases saved from institutions. Persons who may never be in danger of commitment are helped to better emotional adjustments which may, nevertheless, affect their entire lives. Divorces are avoided now and then. Suicides are prevented once in a while. The chronic invalidism of hypochondriasis and other neurotic states may be prevented.

A mental hygiene clinic unit consisting of one psychiatrist, one psychologist, two psychiatric social workers, and a clerk will serve a population of about 100,000. Most mental hygiene clinics are supported by private organizations or Government agencies other than health departments. This has resulted in their being concentrated in the larger centers of population. Very few communities of less than 100,000 persons have mental hygiene service. There are 15 States which have no mental hygiene clinics.

Mental hygiene can grow into an effective weapon only within the framework of a national organization such as the public health facilities, which provide opportunity for correlated development at the Federal, State, and local levels.

The role of the State health department is to stimulate and correlate mental hygiene activities within the State, and arrange part-time traveling clinics for the smaller communities. It should observe and record the epidemiological data which are of growing importance in the field of mental disorders. Organization for mental hygiene in the State health department has been discussed in a previous paper (3).

Twenty-two of the 52 State and territorial health departments already have some type of mental hygiene activity. Connecticut has the oldest health department mental hygiene program. Except for Puerto Rico, which administers a large mental hospital, Hawaii has

the largest health department mental hygiene budget, amounting to $46,850, including $10,000 for hospital care of acute cases.

Three States, California, Oregon, and Iowa, have psychiatrists in training to start mental hygiene programs next year. Illinois, Louisiana, Mississippi, Missouri, and North Dakota have less definite plans for substantial mental hygiene programs in the near future. In Maryland the health department cooperates with the mental hygiene society in holding traveling clinics in connection with certain county health units. In New Jersey, where clinics are held by other agencies, the health department employs an advisor in child-parent relations who does educational work among teachers and public health nurses. In New York the health department is assisting financially an $18,000 budget for the newly established Suffolk County mental hygiene unit.

A social hygiene lecturer is employed full-time in Ohio for sex education work with high school students. He gives some private consultation to students who have personal problems. In Texas a program of mental hygiene education for nurses and teachers is carried on through the combined efforts of the maternal and child health and the educational divisions of the health department. The Washington State health department employs as a part-time consultant the secretary of the State mental hygiene society.

The District of Columbia plans to employ two psychiatrists and cooperate closely with the schools in a mental hygiene program. In several States the operation of birth control clinics may be counted as a mental hygiene activity.

In a broad sense, every State engages in mental hygiene work through the distribution of literature and the holding of maternal and child health clinics, and in educational services. However, for an effective program in keeping with the importance of an illness which is responsible for half of all disability, a special full time mental hygiene department in each State health service is the primary need. The secondary goal is to provide each community which has a health department with the part-time or full-time services of a mental hygiene unit.

Although mental disorders are essentially disturbances of health, social and economic influences are perhaps more important than in other types of disease. Consequently, various other State agencies, including relief and welfare workers, teachers, courts and law enforcement officers and State hospitals are interested in a mental hygiene program. In many instances the lack of a mental hygiene facility to which they can refer cases for consultation has caused them to develop some type of psychiatric or psychological service themselves. Whoever operates a mental hygiene clinic conducts a public service; the mental hygiene division of a State health department should have an advisory board representing the various interested State agencies.

Chief of the difficulties in the rapid achievement of mental hygiene-public health is the lack of trained personnel, particularly psychiatrists, who are familiar with the problems of adult psychiatry and the special practice of mental hygiene and child psychiatry. This makes it necessary, at least at the outset, to pay salaries somewhat higher than in other fields of public health. To provide otherwise adequately trained men with an orientation in public health and child guidance a special 11-month mental hygiene-public health course has been started this year at Johns Hopkins University. It is anticipated that in succeeding years this course will be expanded and that similar courses in other postgraduate schools of public health will be developed.

At the Federal level the Public Health Service is doing a number of things to further mental hygiene. The Service now has in the field a full-time mental hygiene consultant who is assisting in the organization of State mental hygiene programs. This officer serves as a medium of exchange for ideas and techniques developed in the various programs and as a clearing house for the employment of persons qualified for this special type of work.

Mental hygiene projects are considered proper objects of expenditure for title V and title VI Social Security funds obtained through the Maternal and Child Health Division of the Children's Bureau and the Public Health Service. The Service also acts as a public information center on mental hygiene.

A rather complete survey service is offered State hospitals as an aid to their improvement. Two large hospitals for the special treatment of narcotic addiction are operated by the Service. The medical and psychiatric care of Federal prisoners and psychiatric consultation for certain Federal courts is a Service function.

The services of an outstanding authority in industrial mental hygiene have recently been made available through the Division of Industrial Hygiene of the National Institute of Health. A neuropsychiatric research institute patterned after the National Cancer Institute is planned where some of the unsolved problems of nervous and mental diseases may be studied.

The establishment of a comprehensive mental hygiene program need not wait until all or even most of such problems are solved. Troubled people need help now and we know enough to make our efforts at assistance worth-while. If community services are set up now, new techniques can be applied as they evolve without a great lapse of time. This has been the pattern in the development of programs for the control of venereal diseases and other public health problems, and the same principle should apply to mental disorders. If we, as doctors, do not develop mental hygiene techniques in the medical field, how can we reasonably expect them to be handed over to us after they are perfected?

The development of mental hygiene is not only a responsibility of the public health services but an opportunity to give assistance, which is urgently needed and gratefully received, to the public whose health we protect.

REFERENCES

(*1*) Vogel, Victor H.: Our inadequate treatment of the mentally ill as compared with treatment of other sick people. Pub. Health Rep., **56**: 1941 (October 3, 1941). Reprint No. 2320.
(*2*) Bahr, Max A.: A diagnostic clinic and community service as a State hospital function (Indiana.)
(*3*) Vogel, Victor H.: Mental hygiene in the State health department. Pub. Health Rep., **56**: 1 (January 3, 1941). Reprint No. 2221.

DEATHS DURING WEEK ENDED MARCH 28, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Mar 28, 1942	Corresponding week, 1941
Data from 87 large cities of the United States:		
Total deaths	8,905	8,741
Average for 3 prior years	8,968	
Total deaths, first 12 weeks of year	109,781	113,316
Deaths per 1,000 population, first 12 weeks of year, annual rate	12 9	13 3
Deaths under 1 year of age	624	545
Average for 3 prior years	535	
Deaths under 1 year of age, first 12 weeks of year	6,764	6,418
Data from industrial insurance companies		
Policies in force	65,017,199	64,588,630
Number of death claims	13,181	12,619
Death claims per 1,000 policies in force, annual rate	10.6	10 2
Death claims per 1,000 policies, first 12 weeks of year, annual rate	10 3	11 0

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED APRIL 4, 1942

Summary

The number of cases of meningococcus meningitis increased from 90 to 111, with 30 cases reported in New York (of which 26 occurred in New York City). The number of cases reported for the current week is above that for any corresponding week since 1937, when 189 cases were reported. The largest numbers of cases are being reported currently from the New England, Middle Atlantic, and South Atlantic areas.

The number of cases of smallpox increased from 19 to 35. The current incidence is about the same as for the corresponding week last year (34 cases), the lowest on record, and may be compared with a 5-year (1937–41) median of 328 cases for the week. Of the current cases, Texas reported 18 and Tennessee 5.

All of the other common communicable diseases included in the following weekly table recorded decreases as compared with the preceding week. The current incidence of diphtheria, scarlet fever, typhoid fever, and whooping cough is below that for any corresponding week of the preceding 5 years.

Other diseases reported during the current week include 1 case of anthrax in Pennsylvania, 1 case of leprosy in New York, 11 cases of amebic dysentery, 55 cases of bacillary dysentery (44 in Texas), 32 cases of unspecified dysentery (16 in Virginia), 2 cases of Rocky Mountain spotted fever in the Mountain States, 14 cases of tularemia, and 21 cases of endemic typhus fever. The seasonal rise of Rocky Mountain spotted fever (which starts earlier in the west) has apparently begun, while the period of low seasonal incidence for endemic typhus fever in the United States now obtains.

The crude death rate for the current week for 88 large cities in the United States is 12.0 per 1,000 population as compared with 12.5 for the preceding week and 12.4 for the 3-year (1939–41) average for the corresponding week. The accumulated rate to date is 12.8, as compared with 13.2 for 1941.

Telegraphic morbidity reports from State health officers for the week ended April 4, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41
	Apr. 4, 1942	Apr. 5, 1941		Apr. 4, 1942	Apr. 5, 1941		Apr. 4, 1942	Apr. 5, 1941		Apr. 4, 1942	Apr. 5, 1941	
NEW ENG.												
Maine	1	1	1	------	4	4	173	151	151	4	0	0
New Hampshire	0	1	1	6	------	------	8	86	46	0	0	0
Vermont	0	1	0	------	------	------	70	57	43	0	0	0
Massachusetts	5	9	3	------	------	------	1,085	759	632	7	3	2
Rhode Island	0	0	0	------	------	------	267	7	9	0	0	0
Connecticut	1	9	2	------	5	7	365	209	209	2	1	1
MID ATL.												
New York	29	18	18	[1] 15	[1] 24	[1] 22	622	8,459	1,467	30	6	6
New Jersey [2]	3	7	6	4	25	11	379	3,326	1,338	5	1	1
Pennsylvania	11	11	35	------	------	------	1,081	5,310	595	5	7	7
E. NO. CEN.												
Ohio	9	7	25	23	35	20	354	9,278	584	1	1	2
Indiana	6	17	10	23	15	16	125	806	137	0	1	1
Illinois	8	25	35	23	16	22	527	3,660	106	1	2	1
Michigan [2]	2	9	10	2	5	5	202	4,727	393	2	3	2
Wisconsin	4	0	1	55	103	103	870	1,649	562	1	0	1
W. NO. CEN.												
Minnesota	0	2	2	------	2	2	693	6	160	1	0	0
Iowa	1	9	7	5	52	14	267	180	160	0	0	0
Missouri	4	5	11	1	4	27	157	299	41	0	1	0
North Dakota	0	3	0	------	3	5	64	33	33	0	0	0
South Dakota	0	1	0	------	1	1	6	16	4	0	0	0
Nebraska	5	3	3	55	1	------	190	42	42	0	0	0
Kansas	1	3	4	12	7	8	646	1,169	526	2	1	1
SO. ATL.												
Delaware	0	0	0	------	------	------	3	319	15	0	0	0
Maryland [2]	1	1	3	5	44	28	780	344	344	5	5	2
Dist. of Col.	1	0	1	3	3	2	91	328	69	2	1	0
Virginia	3	10	16	311	388	292	217	2,619	421	3	5	1
West Virginia	6	5	9	22	38	67	209	637	18	3	0	1
North Carolina	8	15	15	26	22	33	1,090	1,680	808	2	1	1
South Carolina	7	8	6	605	415	552	347	647	57	2	4	1
Georgia	5	5	7	45	164	168	263	1,207	172	4	1	2
Florida	4	6	5	1	178	25	260	1,136	186	1	1	1
E. SO. CEN.												
Kentucky	7	9	8	9	84	30	111	1,808	151	4	0	1
Tennessee	2	10	10	44	96	132	129	706	84	1	2	2
Alabama	8	4	5	828	124	172	257	698	175	0	3	3
Mississippi [2]	7	0	3	------	------	------	------	------	------	1	6	2
W. SO. CEN.												
Arkansas	2	4	3	197	276	134	322	332	78	1	3	2
Louisiana	3	2	11	3	11	12	292	94	94	0	1	1
Oklahoma	4	5	5	141	175	162	255	46	46	0	1	1
Texas	39	30	24	1,113	1,232	1,157	2,139	1,127	624	7	3	3
MOUNTAIN												
Montana	0	4	2	5	9	9	150	17	17	0	0	0
Idaho	1	1	1	------	------	2	60	20	20	0	0	0
Wyoming	0	1	1	104	------	1	77	57	43	0	0	0
Colorado	6	9	8	49	35	30	254	397	272	1	0	0
New Mexico	0	2	3	3	------	3	133	197	110	0	0	0
Arizona	0	2	2	151	146	122	206	98	98	0	1	0
Utah [2]	0	0	0	7	69	4	235	13	150	0	0	0
Nevada	0	0	------	------	------	------	9	38	------	0	0	------
PACIFIC												
Washington	0	6	1	1	11	1	286	48	51	3	1	1
Oregon	2	0	2	24	16	36	130	404	58	1	2	0
California	17	21	21	220	349	349	5,470	419	419	9	0	2
Total	223	307	358	3,641	4,187	4,187	21,926	55,665	15,331	111	68	68
13 weeks	4,037	3,826	6566,	61526,	463,725	142,811	204,832	375,811	167,831	953	662	682

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended April 4, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Apr 4, 1942	Apr 5, 1941		Apr 4, 1942	Apr 5, 1941		Apr 4, 1942	Apr 5, 1941		Apr 4, 1942	Apr 5 1941	
NEW ENG.												
Maine	0	1	0	13	10	13	0	0	0	0	0	0
New Hampshire	0	0	0	14	3	7	0	0	0	0	0	0
Vermont	0	0	0	11	19	15	0	0	0	0	0	0
Massachusetts	0	0	0	363	220	220	0	0	0	2	1	0
Rhode Island	0	0	0	19	7	22	0	0	0	1	0	0
Connecticut	0	0	0	30	162	142	0	0	0	0	2	2
MID ATL.												
New York	2	0	1	498	610	920	0	0	0	6	4	4
New Jersey	0	0	0	117	338	272	0	0	0	1	3	3
Pennsylvania	0	1	1	494	394	406	0	0	0	1	1	5
E NO CEN.												
Ohio	2	2	1	414	411	363	0	0	1	0	2	2
Indiana	0	0	0	125	161	202	0	2	3	0	1	2
Illinois	0	0	1	238	466	565	1	1	18	1	1	1
Michigan	1	1	1	219	301	522	0	0	9	0	3	2
Wisconsin	0	3	0	175	154	176	0	15	4	2	0	1
W NO CEN.												
Minnesota	0	0	0	89	68	107	0	2	4	0	0	0
Iowa	0	0	0	55	42	112	2	1	34	0	1	1
Missouri	0	0	0	37	120	120	3	1	26	0	0	0
North Dakota	0	0	0	21	4	15	0	0	3	0	0	1
South Dakota	0	0	0	42	27	17	0	1	2	0	0	0
Nebraska	0	0	0	60	38	38	0	0	3	0	0	0
Kansas	0	0	0	105	37	109	0	1	8	0	1	0
SO ATL.												
Delaware	0	0	0	25	7	8	0	0	0	0	0	0
Maryland	0	0	0	79	38	50	0	0	0	2	1	2
Dist of Col	0	0	0	8	14	17	0	0	0	1	0	0
Virginia	0	1	1	18	58	56	0	0	0	0	2	4
West Virginia	0	0	0	39	71	61	0	1	0	4	1	4
North Carolina	0	0	0	27	34	31	0	0	0	1	2	2
South Carolina	1	0	0	2	3	4	0	0	0	6	10	3
Georgia	0	0	0	9	19	13	0	0	0	2	2	3
Florida	0	5	1	8	2	8	0	0	0	2	10	4
E SO CEN												
Kentucky	0	0	0	71	146	89	0	0	0	1	1	6
Tennessee	0	1	1	48	71	67	5	0	1	2	0	2
Alabama	0	0	0	11	20	9	1	0	0	1	0	2
Mississippi	2	1	1	9	9	7	0	0	0	3	2	2
W SO CEN.												
Arkansas	0	0	0	5	12	10	2	1	1	0	1	1
Louisiana	0	2	0	4	8	10	2	0	1	5	2	10
Oklahoma	0	0	0	15	21	22	[3] 1	3	3	2	1	1
Texas	0	2	2	60	63	63	18	3	3	7	5	7
MOUNTAIN												
Montana	1	0	0	32	37	22	0	0	5	0	0	0
Idaho	0	0	0	2	5	11	0	0	3	0	0	1
Wyoming	0	0	0	19	29	17	0	0	1	0	1	0
Colorado	1	0	0	37	40	40	0	0	7	1	3	1
New Mexico	0	0	0	4	6	14	0	0	0	1	1	0
Arizona	0	1	0	4	5	5	0	0	0	1	0	0
Utah	0	0	0	24	12	19	0	0	0	0	0	0
Nevada	0	0	----	2	0	---	0	0	--	0	2	-----
PACIFIC												
Washington	0	0	0	24	17	44	0	2	3	0	1	2
Oregon	0	1	0	12	5	20	1	0	12	0	2	1
California	0	1	1	92	124	195	0	0	9	3	2	4
Total	10	23	23	3,829	4,468	5,188	36	34	328	59	72	98
13 weeks	299	316	279	52,178	49,047	68,971	[3] 301	602	3,982	966	989	1,406

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended April 4, 1942—Continued

Division and State	Whooping cough, Week ended— Mar. 28, 1942	Whooping cough, Week ended— Mar. 29, 1941	Week ended Apr. 4, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	19	13	0								0
New Hampshire	15	0	0								0
Vermont	35	14	0								0
Massachusetts	196	222	0	0	1	0	0	0	0	0	0
Rhode Island	43	26	0								0
Connecticut	83	72	0	0	1	0	1	0	0	0	0
MID. ATL.											
New York	500	335	0	3	3	0	0	1	0	0	1
New Jersey	180	94	0	1	0	0	0	0	0	0	0
Pennsylvania	180	375	1	0	0	0	0	0	0	0	0
E. NO. CEN.											
Ohio	157	284	0	0	0	0	0	0	0	1	0
Indiana	27	21									0
Illinois	157	81	0	1	0	0	0	0	0	1	0
Michigan	131	426	0	0	3	0	0	0	0	0	0
Wisconsin	146	131	0	0	0	0	2	0	0	1	0
W. NO. CEN.											
Minnesota	23	102	0								
Iowa	27	40	0								
Missouri	2	44	0	0	1	0	0	0	0	0	0
North Dakota	1	16	0								0
South Dakota		27	0								0
Nebraska	3	23	0								0
Kansas	49	170	0	0	0	0	0	0	0	1	0
SO. ATL.											
Delaware	8	6	0								0
Maryland	39	93	0	0	0	2	0	0	0	0	0
Dist. of Col.	15	18	0								0
Virginia	53	76	0	0	0	16	0	0	0	0	0
West Virginia	16	44	0								0
North Carolina	156	263	0								0
South Carolina	96	111	0	0	0	0	0	0	0	4	2
Georgia	29	22	0	0	0	0	0	0	0	2	5
Florida	23	19	0	0	0	0	0	0	0	0	3
E. SO. CEN.											
Kentucky	101	74	0								0
Tennessee	23	66	0	1	0	0	0	0	0	2	0
Alabama	51	23	0								0
Mississippi			0	0	0	0	0	0	0	1	0
W. SO. CEN.											
Arkansas	7	43	0	3	0	0	0	0	0	0	0
Louisiana	[4]24	3	0	0	1	0	0	0	0	0	2
Oklahoma	9	59	0	0	0	0	0	0	0	0	0
Texas	181	339	0	1	44	0	0	0	0	1	7
MOUNTAIN											
Montana	26	24	0	0	0	0	0	0	1	0	0
Idaho	4	10	0	0	0	0	0	0	0	0	0
Wyoming	3	1	0	0	0	0	0	0	1	0	0
Colorado	55	99	0	0	0	0	0	0	0	0	0
New Mexico	36	26	0	0	0	0	0	0	0	0	1
Arizona	45	38	0	0	0	14	0	0	0	0	0
Utah	30	60	0	0	0	0	0	0	0	0	0
Nevada	8	8	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	90	115	0	0	0	0	1	0	0	0	0
Oregon	29	11	0	0	0	0	0	0	0	0	0
California	283	485	0	1	1	0	0	0	0	0	0
Total	3,414	4,652	1	11	55	32	4	1	2	14	21
13 weeks	[4]50,708	57,421									

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Later information has been received that only 1 case of smallpox should have been reported in Oklahoma for the week ended Feb. 14, 1942. (See footnote 3, p. 364, Public Health Reports of Mar. 6, 1942.)
[4] Delayed report of 7 cases included.

WEEKLY REPORTS FROM CITIES

City reports for week ended March 21, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0		1	1	0	4	0	4	0	0	0
Baltimore, Md	4	0	1	1	427	6	28	0	11	0	0	23
Barre, Vt	0	0		0	0	0	0	0	0	0	0	0
Billings, Mont	0	0		0	0	0	1	0	0	0	0	0
Birmingham, Ala	0	0	24	4	5	0	7	0	8	0	0	1
Boise, Idaho	0	0		0	3	0	0	0	0	0	0	2
Boston, Mass	0	0		0	118	3	19	0	91	0	1	55
Bridgeport, Conn	0	0		0	10	0	2	0	1	0	0	0
Brunswick, Ga	0	0		0	19	0	0	0	1	0	0	0
Buffalo, N Y	0	0		0	28	0	6	0	23	0	0	2
Camden, N J	2	0		0	4	0	1	0	19	0	0	0
Charleston, S C	0	0	50	1	0	0	2	0	0	0	0	3
Charleston, W Va	0	0		0	0	0	0	0	0	0	0	0
Chicago, Ill	12	0	7	2	123	1	30	0	97	0	1	92
Cincinnati, Ohio	0	0		0	2	0	9	0	31	0	0	19
Cleveland, Ohio	0	0	15	1	11	1	11	0	83	0	1	14
Columbus Ohio	1	0		0	9	0	6	0	3	0	0	6
Concord, N H	0	0		0	0	0	0	0	0	0	0	0
Cumberland, Md	0	0		0	4	0	0	0	0	0	0	0
Dallas, Tex	2	0	2	1	268	0	7	0	2	0	0	2
Denver, Colo	6	0	20	0	122	0	2	0	5	0	0	10
Detroit, Mich	8	0	1	2	67	0	17	0	110	0	1	76
Duluth, Minn	0	0		0	0	0	0	0	16	0	0	0
Fall River, Mass	0	0		0	17	0	1	0	40	0	0	0
Fargo, N Dak	0	0		0	0	0	0	0	0	0	0	0
Flint, Mich	0	0		0	2	0	4	0	3	0	0	0
Fort Wayne, Ind	0	0		0	1	0	5	0	1	0	0	0
Frederick, Md	0	0		0	52	0	1	0	2	0	0	0
Galveston, Tex	0	0		0	6	0	1	0	0	0	0	0
Grand Rapids, Mich	0	0		0	3	0	1	0	3	0	0	1
Great Falls, Mont	0	0		0	39	0	2	0	1	0	0	0
Hartford, Conn	0	0		0	25	3	0	1	0	0	0	0
Helena, Mont	0	0		0	0	0	0	0	0	0	0	7
Houston, Tex	3	0		0	55	0	10	0	1	0	1	0
Indianapolis, Ind	2	0		1	55	0	11	0	32	0	0	17
Kansas City, Mo	0	0		0	35	0	5	0	34	0	0	2
Kenosha, Wis	0	0		0	1	0	0	0	4	0	0	6
Little Rock, Ark	0	0	12	0	107	0	1	0	0	0	0	0
Los Angeles, Calif	2	0	17	0	637	0	16	0	29	0	1	20
Lynchburg, Va	0	0		0	0	0	3	0	2	0	0	10
Memphis, Tenn	0	0	11	0	14	0	5	0	8	0	0	2
Milwaukee, Wis	0	0		0	71	0	0	0	40	0	0	57
Minneapolis, Minn	1	0		0	182	0	2	0	16	0	0	5
Missoula, Mont	0	0		0	0	0	0	0	2	0	0	0
Mobile, Ala	0	0		2	2	0	5	0	0	0	0	0
Nashville, Tenn	0	0		2	0	0	3	0	3	0	0	8
Newark, N J	0	0	4	0	104	1	5	1	23	0	0	35
New Haven, Conn	0	0		0	247	1	0	0	0	0	0	15
New Orleans, La	3	1	1	0	22	1	0	1	3	0	1	0
New York, N Y	23	0	11	4	59	18	68	0	331	0	1	243
Omaha, Nebr	1	0		0	201	0	2	0	3	0	0	1
Philadelphia, Pa	1	0	1	0	34	1	30	0	277	0	1	76
Pittsburgh, Pa	3	0		3	23	1	14	0	13	0	0	15
Portland, Me	0	0		0	6	4	2	0	4	0	0	1
Providence, R I	0	0	1	0	109	0	4	0	7	0	0	18

City reports for week ended March 21, 1942

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Pueblo, Colo	0	0	-	0	12	0	3	0	3	0	0	2
Racine, Wis	0	0	--	0	17	1	0	0	1	0	0	11
Raleigh, N C	0	0		0	1	0	1	0	1	0	0	2
Reading, Pa	0	0	1	1	2	0	1	0	3	0	0	2
Richmond, Va	0	0	1	1	0	0	4	0	3	0	0	0
Roanoke, Va	0	0		0	0	0	0	0	1	0	0	3
Rochester, N Y	0	0		0	6	0	3	0	8	0	0	9
Sacramento, Calif	2	0	1	1	100	0	5	0	2	0	0	5
Saint Joseph, Mo	0	0		0	7	0	7	0	3	0	0	0
Saint Louis Mo	2	1	-	0	227	0	15	0	18	0	0	4
Saint Paul, Minn	1	0		0	547	0	3	0	12	0	0	15
Salt Lake City, Utah	0	0		0	7	0	1	0	6	0	0	21
San Antonio, Tex	7	0	4	0	15	0	9	0	2	0	0	4
San Francisco, Calif	0	1	1	0	35	0	13	0	9	0	0	0
Savannah, Ga	0	0	36	2	53	0	1	0	1	0	0	0
Seattle, Wash	0	0	-	2	6	1	5	0	4	0	0	42
Shreveport La	0	0	-	0	8	0	3	0	1	0	0	0
South Bend, Ind	0	0	----	0	0	0	1	0	19	0	0	0
Spokane, Wash	0	0	---	0	8	0	3	0	2	0	0	2
Springfield, Ill	0	0	---	0	171	0	1	0	12	0	0	0
Springfield, Mass	0	0	-	0	10	0	4	0	26	0	0	6
Superior, Wis	0	0	-	0	0	0	0	0	2	0	1	12
Syracuse, N Y	0	0		0	46	1	1	0	5	0	1	30
Tacoma, Wash	0	0	--	0	0	0	0	0	0	0	0	2
Tampa, Fla	0	0	--	1	11	0	6	0	0	0	2	0
Terre Haute, Ind	0	0		0	5	0	4	0	2	0	0	1
Topeka, Kans	0	0		0	1	1	1	0	2	0	0	7
Trenton, N J	0	0	2	1	4	0	4	0	7	0	0	10
Washington, D C	0	0	5	2	83	1	17	0	16	0	0	15
Wheeling W Va	0	0		0	14	0	2	0	2	0	0	0
Wichita Kans	0	0	1	0	47	0	3	0	0	1	0	2
Wilmington, Del	1	0		1	2	0	5	0	13	0	0	0
Winston-Salem, N C	0	0	1	0	102	0	4	0	4	0	0	0
Worcester Mass	0	0		0	18	0	3	0	5	0	0	50

Dysentery, amebic.—Cases Detroit, 2
Dysentery, bacillary.—Cases Camden, 1, Cleveland, 1, Los Angeles, 2, New York, 3, Syracuse, 2.
Leprosy.—Cases New Orleans, 1
Tularemia.—Cases New Orleans, 1
Typhus fever.—Cases Birmingham, 1

Rates (annual basis) per 100,000 population for the group of 89 cities included in the preceding table (estimated population, 1942, 34,058,143)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended Mar 21, 1942	13 32	36 59	5 66	749 42	72 88	242 20	0 15	1 99	168 56
Average for week 1937-41	*16 54*	*83 45*	*14 68*	*1292 40*	*109 26*	*287 90*	*4 02*	*3 86*	*181 27*

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended March 7, 1942.—During the week ended March 7, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		3	4		7				1	15
Chickenpox	1	15	8	220	288	70	21	36	222	876
Diphtheria	5	17	2	19	6	8	1			58
Dysentery				4						4
Encephalomyelitis				1						1
German measles		6		33	74	9	20	10	58	210
Influenza		16			4				32	52
Measles		13	4	577	179	203	20	19	51	1,066
Mumps			5	515	360	162	70	100	620	1,832
Pneumonia	5	5			22	2			10	44
Poliomyelitis			2						1	3
Scarlet fever	2	6	7	118	306	50	17	56	30	592
Trachoma						1			1	2
Tuberculosis	1	21	14	61	34		7	1		139
Typhoid and paratyphoid fever			2	6	3				1	12
Undulant fever					1				1	2
Whooping cough	2	23	1	159	44	3	4	4	26	266
Other communicable diseases	8	16		2	190	43	6	2	9	276

CUBA

Provinces—Notifiable diseases—4 weeks ended February 28, 1942.—During the 4 weeks ended February 28, 1942, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	2	2	1	9		12	26
Chickenpox					3	3	6
Diphtheria	3	31	1	2		1	38
Hookworm disease		16					16
Leprosy		1			6	3	10
Malaria	194	37	2	13	5	617	868
Measles		47	3				50
Scarlet fever		2					2
Tuberculosis	*29*	*67*	*21*	*41*	*26*	*31*	*215*
Typhoid fever	9	66	4	26	7	20	132
Yaws						3	3

[1] Includes the city of Habana.

FINLAND

Communicable diseases—November 1941.—During the month of November 1941, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	118	Poliomyelitis	3
Influenza	994	Scarlet fever	226
Paratyphoid fever	42	Typhoid fever	62

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

Plague

Indochina (French).—For the period February 11 to 28, 1942, 17 cases of plague were reported in French Indochina. For the first 10 days of March 1942, 13 cases of plague were reported in the same place.

Typhus Fever

Algeria.—For the week ended February 28, 1942, 1,912 cases of typhus fever were reported in Algeria, including 100 cases in Algiers and 39 cases in Oran.

Irish Free State—County Wicklow—Tinahely—Knockshanrock.—For the week ended March 14, 1942, 2 fatal cases of typhus fever were reported in Knockshanrock, Tinahely, County Wicklow, Irish Free State.

Morocco.—During the week ended March 14, 1942, 988 cases of typhus fever were reported in Morocco (983 cases in the preceding week).

Rumania.—During the week ended March 21, 1942, 171 cases of typhus fever were reported in Rumania, as compared with 161 cases reported in the preceding week.

Spain.—For the week ended February 28, 1942, 328 cases of typhus fever were reported in Spain, including 67 in Madrid, 11 in Seville, and 42 in Barcelona.

Tunisia.—For the week ended February 21, 1942, 616 cases of typhus fever were reported in Tunisia, including 87 cases in Tunis. During the week ended February 14, 651 cases (34 in Tunis) were reported.

COURT DECISIONS ON PUBLIC HEALTH

Liability for sale of contaminated beverage.—(Georgia Court of Appeals, Division No. 1; *Crosby et al.* v. *Calaway*, 16 S.E.2d 155; decided July 8, 1941.) In an action brought for injury alleged to have resulted from drinking a bottled beverage which was contaminated, the Georgia Court of Appeals, in the course of its opinion, referred to the following section of the State code: "Any person who knowingly or carelessly sells to another unwholesome provisions of any kind, the defect being unknown to the purchaser, by the use of which damage results to the purchaser or his family, shall be liable in damages for such injury." The court said that this did not apply to clerks or agents who were not shown to have undertaken to perform the duty of inspection required of distributors or retailers. "We think this section is applicable to principals and not agents."

In closing the opinion the court stated that an agent or clerk in a retail store, who merely passed out the articles and received the price for the principal, was not liable for defects in the article sold unless he had actual knowledge of the defects, or unless he assumed the responsibility which the law placed upon retailers and distributors of food, or unless he owed some particular duty to the purchaser. "Before an agent becomes liable for an act or omission alleged to have constituted negligence with resultant injury it must appear that such agent agreed to perform such act for his principal, or had assumed to perform it."

Death from disease caused by bacillus enteriditis held compensable under workmen's compensation act.—(Utah Supreme Court; *Andreason et al.* v. *Industrial Commission et al.*, 100 P. 2d 202, decided March 13, 1940; rehearing denied May 31, 1940, 102 P. 2d 894) An employee of an animal by-products company, whose duties consisted of skinning and butchering animals, died as a result of contracting a disease attributed to bacillus enteriditis. His widow sought compensation under the Utah workmen's compensation law for herself and her minor children. The illness from which the employee died was uncommon and rare, and there were no other known cases in the State. The disease was one that was acquired from contact with diseased animals or diseased meat. There was no evidence that the deceased came in contact with any diseased animals except at his work. The statute provided for compensation for the injury or death of an employee "by accident arising out of or in the course of his employment." The law also stated that "personal injury by accident arising out of or in the course of employment" should "not include a disease, except as it shall result from the injury." The Utah Supreme Court said that two questions confronted it, namely, was the disease an accidental

injury, and, if so, was it contracted in the course of the deceased's employment. These questions were answered in the affirmative.

The court was of the opinion that under the compensation law an injury arising out of an accident was not limited in meaning to the result of the application of physical force to the body of the injured. An accidental injury might well be expressed as a disability happening by chance or unexpectedly but must, however, be connected with the employment. We do not wish to imply, said the court, that, because one becomes ill while at work, the statute applies to him, even though it may be that he became ill unexpectedly. "That alone is not sufficient to make this case one of an accidental injury. There must be a causal connection between his employment, or his place of employment, and his illness—something which happened to him in the performance of his duties, or some contact he made at his place of employment while on duty there—which forms the connecting link between his employment and the contraction of the illness. And, we might add, which is not an occupational disease." Respecting the legislative provision, above-mentioned, relative to personal injury by accident not including disease, the supreme court referred to one of its prior decisions in which it had been stated that the purpose of the legislature in so enacting was to eliminate occupational diseases.

Relative to the evidence, the court stated that it believed that there was only one reasonable inference to be drawn and that was that the deceased contracted the disease in the course of his employment.

The court held that, so far as the questions submitted to it were concerned, the dependents of the deceased were entitled to compensation.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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Public Health Reports

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DISTRIBUTION OF HEALTH SERVICES IN THE STRUCTURE OF STATE GOVERNMENT *

CHAPTER IV. VENEREAL DISEASE CONTROL BY STATE AGENCIES

By JOSEPH W. MOUNTIN, *Assistant Surgeon General*, and EVELYN FLOOK, *United States Public Health Service*

State activities for venereal disease control, probably more than for any other health problem covered in a study made by the United States Public Health Service during the year 1940, are characterized by expansion over the past decade. This statement is based on the survey of facilities and services as they existed in 1940 in the structure of State government, contrasted with the situation in 1930, when the second edition of Public Health Bulletin No. 184[1] was compiled. The third edition, of which this is a chapter, differs from those which preceded it in that this is a review of health resources in every branch of State government, whereas the others took into account facilities of the State health department only. When reading this, as well as other chapters of the 1940 revision of Public Health Bulletin No. 184, it must be borne in mind that the services and facilities described are those operated by departments of the State government; those operated by voluntary and local agencies do not appear in the picture.

* From the States Relations Division This is the fourth chapter of the third edition of Public Health Bulletin No 184 Previous chapters are

Mountin Joseph W, and Flook, Evelyn Distribution of health services in the structure of State government Chapter I The composite pattern of State health services Public Health Rep, 56 1673 (August 22, 1941) Reprint 2306

Mountin, Joseph W, and Flook, Evelyn Distribution of health services in the structure of State government Chapter II Communicable disease control by State agencies Public Health Rep 56 2233 (November 21, 1941) Reprint 2334

Mountin, Joseph W, and Flook, Evelyn Distribution of health services in the structure of State government Chapter III Tuberculosis control by State agencies Public Health Rep, 57 65 (January 16, 1942) Reprint 2348

Succeeding chapters will be published in subsequent issues of the Public Health Reports

[1] Ferrell, John A, Smillie, Wilson G, Covington, Platt W, and Mead, Pauline A, International Division of the Rockefeller Foundation for the Conference of State and Provincial Health Authorities of North America Health Departments of States and Provinces of the United States and Canada Public Health Bulletin No 184 (Revised). United States Government Printing Office, Washington, 1932.

While it is true that the venereal diseases have long been recognized as an outstanding public health problem by specialists in this field, there has been marked acceleration of effort for venereal disease control during the past ten years. Extension of State service for prevention and cure of the venereal diseases is a natural outgrowth of the relatively recent publicity accorded the magnitude of the problem and of the changed concept of public responsibility in matters involving community and personal health. Provision, at public expense, of diagnostic and therapeutic service for the individual characterizes practically all State programs and stems from the recognition that cure of these diseases is the most effective method of preventing spread of infection. Theoretically, State programs are designed to include control measures for the entire group of the venereal diseases: syphilis, gonorrhea, chancroid, granuloma venereum, and lymphogranuloma inguinale. In actual practice, however, the so-called venereal disease programs as organized during the year covered by this study (1940) were largely restricted to activities for syphilis control, with only minor consideration for the problem of gonorrhea and the remaining illnesses of this classification. Consequently, in the discussion which follows, "venereal disease control" represents, for the most part, "syphilis control."

The current status of State participation in such programs may be described by the extent to which the several agencies of State government engage in one or more of six different types of activity, namely, promulgation and/or enforcement of State laws, rules, and regulations for venereal disease control; promotion of local programs of control; participation in educational programs for venereal disease control; provision of supervisory and/or consultatory service to local health organizations; distribution and/or administration of financial grants-in-aid to local health units for venereal disease control; and operation of a direct service program. By design, this inquiry, as noted previously, is limited to a description of resources and efforts of State agencies; it does not cover corresponding information for comparable agencies operating below the State level.

Inasmuch as the survey herein reported was limited to activities of official departments, boards, commissions, and institutions of State government, this report would not normally embody any discussion of the activities of Federal agencies in relation to venereal disease control. Nevertheless, in order that the State programs may be more clearly understood, it should be said at the outset that all State[2] provisions for venereal disease control have been immeasurably influenced by Federal leadership. The foundation for the present venereal disease control program was laid during the first World War.

[2] The term "State" as used in the discussion which follows includes the States, the Territories, the District of Columbia, and the Virgin Islands.

This came about largely as a result of stimulation by the United States Interdepartmental Social Hygiene Board and funds made available by Congress under the provisions of the Chamberlain-Kahn Act. The appropriation was not sustained and interest in venereal disease control languished following the cessation of hostilities. Funds from the Federal government again were made available following the

TABLE 1.—*Official State agencies participating in the venereal disease programs of each State and Territory, the District of Columbia, and the Virgin Islands**

State or Territory	Department of State government						
	Health	Welfare, social security, or public assistance	Agriculture	Education	State university or college	Independent State hospital or laboratory	Other
Alabama	x						
Arizona	x					x	
Arkansas	x				x		
California	x						
Colorado	x				x		
Connecticut	x						x
Delaware	x						
District of Columbia	x						x
Florida	x			x			x
Georgia	x						
Idaho [a]	x						
Illinois	x						
Indiana	x			x	x		
Iowa	x				x		
Kansas	x						
Kentucky	x						
Louisiana	x					x	
Maine [a]	x						
Maryland	x						
Massachusetts	x						
Michigan	x		x				
Minnesota	x				x		
Mississippi	x						
Missouri	x						
Montana	x						
Nebraska	x						
Nevada	x						
New Hampshire	x						
New Jersey	x						
New Mexico	x						
New York	x						
North Carolina	x						
North Dakota	x						
Ohio	x				x		x
Oklahoma	x						
Oregon	x						
Pennsylvania	x						
Rhode Island	x						
South Carolina	x						
South Dakota	x						
Tennessee	x		x	x			x
Texas	x						
Utah	x						
Vermont	x						
Virginia	x				[b] x		
Washington	x	x					
West Virginia	x	x					x
Wisconsin	x	x				x	
Wyoming	x		x				
Alaska	x						
Hawaii	x						
Puerto Rico	x						
Virgin Islands	x						

*Any differences between information presented in this table and corresponding entries in table 1, ch. I, of this series are the result of further refinement of the data since publication of the initial article.

[a] The department of health is really a division (Idaho) and bureau (Maine) of public health, subordinate to the department of welfare (Idaho) and the department of health and welfare (Maine).

[b] Two agencies of this classification.

passage of the Social Security Act in 1935. The program was given further impetus under the more generous provisions of the Venereal Disease Control Act of 1938, which is an amendment to the original Act of 1918. According to the 1938 statute, eligibility of a State for Federal aid is dependent upon its meeting certain standards of operation; thus, in addition to being strengthened through financial assistance, State programs for venereal disease control have many common characteristics. Despite the influences that tend toward standardization, a high degree of individuality still obtains as may be determined from the discussion and tables that follow.

VARIATION IN PROCEDURES FOR VENEREAL DISEASE CONTROL

Major responsibility for venereal disease control has been delegated to the health department in every State. As a matter of fact, in two-thirds of the jurisdictions it is the sole agency of State government concerned with this problem. Table 1 demonstrates the outstanding position of the health department in the venereal disease control scene and it also identifies other agencies which, with varying frequency, supplement health department activities in certain States. In several areas, it will be noted, the main program is augmented by services of more than one additional agency. State universities or colleges are more apt to function collaterally with the health department than is any other type of agency, though departments of welfare, agriculture, and education, independent hospitals, and independent laboratories occasionally participate. Contributions of governmental units other than health departments are subsidiary in character when considered in terms of the aggregate State plan. Particularly is this true of the services offered by agencies grouped under the heading "Other," which includes a board of control, board of commissioners, department of conservation, State fire marshal, dairy and food commission, and hotel commission, each confined to a single State. The general content of the program of each State may be determined from table 2.

Since State activities for venereal disease control are primarily limited to the health department, variations among the several jurisdictions are chiefly, though not entirely, attributable to differences in health department practices rather than to dissimilarity in the distribution of responsibility. Table 2 discloses the extent of these variations and, concomitantly, of the uniformity which exists. The code system used in the table is explained at the end thereof.

TABLE 2.—*Department of State government* responsible for specific activities designed to control venereal diseases in each State and Territory, the District of Columbia, and the Virgin Islands*

Activity	State or Territory								
	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia	Florida
Promulgates and/or enforces State laws, rules, and regulations for venereal disease control	1	1	1	1	1	1, 7	1	1, 7	1, 7
Promotes local programs of control	1	1	1	1	1	1	1	------	1
Conducts educational programs in venereal disease control for									
The general public	1	1	1	1	1	1	1	• 1	1
School groups	1	1	1	1	1	1	1		
Private physicians	1	1	1	1	1	1	1	• 1	1
Health department personnel	1	1	1	1	1	1	1	1	1
Other special groups	------	------	------	1	1	------	------	------	------
Supervises and/or provides consultation service to local organizations	1	1	1	1	1	1	1	------	1
Distributes and/or administers grants-in-aid to local health units for venereal disease control	1	1	1	1	1	1	1	------	1
Operates a direct service program:									
Collects and analyzes reports of venereal diseases	1	1	1	1	1	1	1	1	1
Conducts special studies to determine the prevalence of syphilis in the State	------	------	------	1	1	1	1	1	1
Furnishes free drugs—									
Neoarsphenamine	1	1	1	1	1	1	1	1	1
Arsphenamine	------	------	------	------	------	1	------	1	------
Other arsenicals	1	1	1	1	1	1	1	1	1
Mercury	1	1	------	------	------	------	------	1	------
Bismuth	1	1	1	1	1	1	1	1	1
Iodides	1	------	------	------	------	------	------	------	------
Sulfonamides	1	1	1	1	1	------	1	1	------
Other	1	------	------	------	------	------	------	------	------
Distributes free drugs for—									
All reported cases	1	1	------	1	1	------	1	1	1
Clinic patients and indigent patients treated by private physicians	------	------	1	------	------	------	------	------	------
Clinic patients only	------	------	------	------	------	1	------	------	------
Provides free diagnostic laboratory service	1	6	[1] 1	1	1	1	1	1	1
Operates or directly finances clinics	------	------	------	1	1	1	1	1	------
Finances treatment of patients by private physicians in their offices	------	1	------	1	1	1	1	------	------
Makes field investigations (follow-up and case-finding services) of—									
All delinquent cases	------	------	------	------	------	------	1	------	------
Infectious delinquent cases	------	------	------	------	------	1	------	------	------
Other selected cases	1	1	------	1	1	1	1	1	------
Contacts	1	1	------	1	1	1	1	1	1
Provides free hospitalization for venereal disease patients	------	------	5	1	5	------	------	1	------
Renders other services not included in this classification	1	------	------	------	1	------	1	------	1, 4

See footnotes at end of table

Table 2.—*Department of State government responsible for specific activities designed to control venereal diseases in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory								
	Georgia	Idaho [a]	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine [a]
Promulgates and/or enforces State laws, rules, and regulations for venereal disease control	1	1	1	1	1	1	1	1, [b]6	1
Promotes local programs of control	1	1	1	1	1	1	1	1	1
Conducts educational programs in venereal disease control for—									
The general public	1	1	1	1, 4	1	1	1	1	1
School groups			1	1, 4	1	1	1		1
Private physicians	1	1	1	1	1	1	1	1	1
Health department personnel	1	1	1	1	1	1	1	1	1
Other special groups	1		1		1			1	
Supervises and/or provides consultation service to local organizations	1	1	1	1	1	1	1	1	1
Distributes and/or administers grants-in-aid to local health units for venereal disease control	1	1	1	1	1	1	1	1	
Operates a direct service program:									
Collects and analyzes reports of venereal diseases	1	1	1	1	1	1	1	1	1
Conducts special studies to determine the prevalence of syphilis in the State	1	1	1	1	1				
Furnishes free drugs—									
Neoarsphenamine	1	1	1	1	1	1	1	1	1
Arsphenamine		1			1		1		
Other arsenicals	1	1	1	1	1	1	1	1	1
Mercury		1	1				1		1
Bismuth	1	1	1	1	1	1	1	1	1
Iodides			1						1
Sulfonamides	1		1		1	1	1		1
Other					1				
Distributes free drugs for—									
All reported cases	1	1	1	1	1		1	[f]1	1
Clinic patients and indigent patients treated by private physicians						1			
Clinic patients only									
Provides free diagnostic laboratory service	1	1	1	1	1	[i]1	1	1	1
Operates or directly finances clinics						1		[b]6	1
Finances treatment of patients by private physicians in their offices	1	[i]1	1		[i]1				1
Makes field investigations (follow-up and case-finding services) of—									
All delinquent cases			1						1
Infectious delinquent cases			1	1	1				
Other selected cases			1		1				
Contacts			1	1	1				1
Provides free hospitalization for venereal disease patients				[j]5	1, [j]5			[j, k]6	1
Renders other services not included in this classification	1	1	1	1	1		1	1	1

See footnotes at end of table.

Table 2.—*Department of State government responsible for specific activities designed to control venereal diseases in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska	Nevada
	State or Territory								
Promulgates and/or enforces State laws, rules, and regulations for venereal disease control	1	1	1, 3	1, 5	1	1	1	1	1
Promotes local programs of control	1	1	1	1	1	1	1	1	1
Conducts educational programs in venereal disease control for									
The general public	1	1	1	1	1	1	1	1	1
School groups	----	----	1	1	1	1	1	1	----
Private physicians	1	1	1	1	1	1	1	1	1
Health department personnel	1	----	1	1	1	1	1	----	----
Other special groups	----	----	1	----	----	----	----	----	----
Supervises and/or provides consultation service to local organizations	1	1	1	1	1	1	1	1	1
Distributes and/or administers grants-in-aid to local health units for venereal disease control	1	1	1	1	1	1	1	----	----
Operates a direct service program:									
Collects and analyzes reports of venereal diseases	1	1	1	1	1	1	1	1	1
Conducts special studies to determine the prevalence of syphilis in the State	1	----	1	1	1	1	----	----	----
Furnishes free drugs—									
Neoarsphenamine	1	1	1	1	1	1	1	1	1
Arsphenamine	----	1	1	----	----	----	----	----	----
Other arsenicals	1	1	1	1	1	----	1	----	1
Mercury	----	----	----	1	----	----	1	1	1
Bismuth	1	1	1	1	1	1	1	1	1
Iodides	----	----	----	----	----	----	1	----	----
Sulfonamides	1	----	1	1	1	1	----	----	1
Other	----	----	1	----	----	----	----	----	1
Distributes free drugs for—									
All reported cases	1	1	1	‘1	1	1	1	‘1	----
Clinic patients and indigent patients treated by private physicians	----	----	----	----	----	----	----	----	1
Clinic patients only	----	----	----	----	----	----	----	----	----
Provides free diagnostic laboratory service	1	1	1	1	1	1	1	1	1
Operates or directly finances clinics	----	----	----	1, 5	----	1	----	1, 5	1
Finances treatment of patients by private physicians in their offices	1	‘1	----	----	----	----	1	----	1
Makes field investigations (follow-up and case-finding services) of—									
All delinquent cases	----	----	----	----	----	1	----	----	----
Infectious delinquent cases	----	----	----	1	----	----	----	1	----
Other selected cases	----	1	1	1	----	1	----	----	1
Contacts	----	1	1	----	----	1	‘1	1	1
Provides free hospitalization for venereal disease patients	----	1	----	1, 5	----	----	----	----	----
Renders other services not included in this classification	1	----	----	----	----	1	1	1	----

See footnotes at end of table.

TABLE 2.—*Department of State government responsible for specific activities designed to control venereal diseases in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory								
	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon
Promulgates and/or enforces State laws, rules, and regulations for venereal disease control	1	1	1	1	1	1	1, 5, 7	1	1
Promotes local programs of control	1	1	1	1	1	1	1	1	1
Conducts educational programs in venereal disease control for:									
The general public	1	1	1	1	1	1	1	1	1
School groups	1	1	1	1	1	1	1	1	1
Private physicians	1	1	1	1	1	1	1	1	1
Health department personnel	1	1	1	1	1	1	1	1	1
Other special groups	------	1	1	------	1	------	------	------	1
Supervises and/or provides consultation service to local organizations	1	1	1	1	1	1	1	1	1
Distributes and/or administers grants-in-aid to local health units for venereal disease control	------	1	1	1	1	1	1	1	1
Operates a direct service program.									
Collects and analyzes reports of venereal diseases	1	1	1	1	1	1	1	1	1
Conducts special studies to determine the prevalence of syphilis in the State	1	1	------	------	------	1	1	1	1
Furnishes free drugs—									
Neoarsphenamine	1	1	1	1	1	1	1	1	1
Arsphenamine	------	------	------	1	------	------	------	------	------
Other arsenicals	1	1	1	1	1	1	1	1	1
Mercury	------	------	1	------	------	------	------	------	------
Bismuth	1	1	1	1	1	1	1	1	1
Iodides	1	------	------	------	------	------	------	------	------
Sulfonamides	1	1	1	1	1	------	------	1	1
Other	------	------	1	------	------	1	------	------	------
Distributes free drugs for—									
All reported cases	1	------	1	1	1	1	------	1	------
Clinic patients and indigent patients treated by private physicians	------	1	------	------	------	------	1	------	1
Clinic patients only	------	------	------	------	------	------	------	------	------
Provides free diagnostic laboratory service	1	1	1	1	1	1	1	1	1
Operates or directly finances clinics	1	1	------	------	------	------	5	1	------
Finances treatment of patients by private physicians in their offices	1	------	1	1	------	1	1	------	------
Makes field investigations (follow-up and case-finding services) of—									
All delinquent cases	1	------	------	------	------	------	------	1	------
Infectious delinquent cases	1	1	------	1	------	1	------	------	------
Other selected cases	1	1	------	------	1	------	------	------	------
Contacts	1	1	------	1	------	1	------	1	------
Provides free hospitalization for venereal disease patients	1	------	------	------	------	1	------	------	------
Renders other services not included in this classification	------	1	------	1	1	------	------	1	------

See footnotes at end of table.

Table 2.—*Department of State government responsible for specific activities designed to control venereal diseases in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia
	State or Territory								
Promulgates and/or enforces State laws rules and regulations for venereal disease control	1	1	1	1	1 3 7	1	1	1	1 [b]5
Promotes local programs of control	1	1	1	1	1	1	1	1	1
Conducts educational programs in venereal disease control for									
The general public	1	1	1	1	1	1	1	1	1
School groups	1		1	1	1 4	1	1	1	1
Private physicians	1	1	1	1	1	1	1	1	1
Health department personnel	1	1	1	1	1	1	1	1	1
Other special groups									
Supervises and/or provides consultation service to local organizations	1	1	1	1	1	1	1	1	1
Distributes and/or administers grants in aid to local health units for venereal disease control	1		1		1	1	--	-	1
Operates a direct service program									
Collects and analyzes reports of venereal diseases	[d] 1	1	1	1	1	1	1	1	1
Conducts special studies to determine the prevalence of syphilis in the State		1	1		1	-			1, 5
Furnishes free drugs—									
Neoarsphenamine	1	1	1	1	1	1	1	1	1
Arsphenamine	1								1
Other arsenicals	1	1	1	1	1	1	1	1	1
Mercury	1		1					1	
Bismuth	1	1	1	1	1	1	1	1	1
Iodides								1	
Sulfonamides	1	1	1	1		1	1	1	
Other									
Distributes free drugs for—									
All reported cases		1	1	1	1		1	1	1
Clinic patients and indigent patients treated by private physicians	1					1			
Clinic patients only									
Provides free diagnostic laboratory service	1	1	1	1	1	1	1	1	1,[b]5
Operates or directly finances clinics	1	1	1		1		1	1	[b]5
Finances treatment of patients by private physicians in their offices		1		1				1	
Makes field investigations (follow up and case finding services) of—									
All delinquent cases	1	1					1	1	
Infectious delinquent cases		1							
Other selected cases			1						1
Contacts	1	1	1		1		1	1	1
Provides free hospitalization for venereal disease patients				1					
Renders other services not included in this classification	1		1				1		[b]5

See footnotes at end of table

TABLE 2.—*Department of State government responsible for specific activities designed to control venereal diseases in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Washington	West Virginia	Wisconsin	Wyoming	Alaska	Hawaii	Puerto Rico	Virgin Islands
Promulgates and/or enforces State laws, rules, and regulations for venereal disease control	1, 2	1	1, 2	1, 3	1	1	1	1
Promotes local programs of control	1	1	1	1	1	1	1	------
Conducts educational programs in venereal disease control for.								
The general public	1	1	1	1	1	1	1	1
School groups	1	1	1	1	------	1	1	------
Private physicians	1	1	1	------	1	------	1	------
Health department personnel	1	1	1	------	1	------	1	------
Other special groups	------	------	------	------	------	------	------	------
Supervises and/or provides consultation service to local organizations	1	1	1	1	1	1	1	------
Distributes and/or administers grants-in-aid to local health units for venereal disease control	1	1, 2	1	------	------	1	------	------
Operates a direct service program								
Collects and analyzes reports of venereal diseases	1	1	[e] 1	1	1	1	1	1
Conducts special studies to determine the prevalence of syphilis in the State	1	1	1	------	------	1	1	1
Furnishes free drugs								
Neoarsphenamine	1	1	1	1	1	1	1	1
Arsphenamine	1	------	1	------	1	------	------	------
Other arsenicals	1	1	1	1	1	1	1	1
Mercury	------	1	1	1	------	1	------	------
Bismuth	1	1	1	1	1	1	1	1
Iodides	------	1	1	1	------	1	------	------
Sulfonamides	1	1	1	1	1	1	1	1
Other	1	------	------	------	------	------	1	------
Distributes free drugs for—								
All reported cases	1	[f] 1	1	------	------	------	[g] 1	[h] 1
Clinic patients and indigent patients treated by private physicians	------	------	------	1	1	1	------	------
Clinic patients only	------	------	------	------	------	------	1	1
Provides free diagnostic laboratory service	1	1	6	1	1	1	1	1
Operates or directly finances clinics	------	------	1	1	------	1	1	1
Finances treatment of patients by private physicians in their offices	------	------	1	------	1	------	------	------
Makes field investigations (follow-up and case-finding services) of—								
All delinquent cases	------	------	1	------	------	------	------	1
Infectious delinquent cases	1	------	------	------	------	------	1	------
Other selected cases	------	------	------	------	------	1	------	------
Contacts	1	------	1	------	1	1	1	1
Provides free hospitalization for venereal disease patients	[j] 2	7	1	------	------	------	------	1
Renders other services not included in this classification	1	------	1	1	------	------	------	1

*Code.
1. Health department
2. Department of welfare, social security, or public assistance
3. Department of agriculture
4. Department of education
5. State university or college
6. Independent State hospital or laboratory
7. Other departments of State government

[a] The department of health is really a division (Idaho) and bureau (Maine) of public health, subordinate to the department of welfare (Idaho), and the department of health and welfare (Maine).
[b] Two agencies of this classification function in this manner.
[c] Function of the official agency is cooperation with a voluntary agency which initiates the work.
[d] Of syphilis only. Gonorrhea not reportable.
[e] Syphilis reports limited to acute communicable cases.
[f] Upon request.
[g] If case is infectious.
[h] If patient is treated as a municipal patient the municipality provides the necessary drugs. Nevertheless, if in the judgment of the chief municipal physician the patient is able to pay for treatment, he is subsequently billed for the services.
[i] For selected cases, selected areas, or under other special conditions.
[j] As part of the State's program of general hospital care for the needy.
[k] Three agencies of this classification function in this manner.

The function of law enforcement is perhaps a more prominent feature of venereal disease control than of many public health programs. Every State health department exercises some sort of regulatory authority designed to prevent the spread of venereal disease, but the scope of such authority varies among the States. Without exception it includes promulgation and enforcement of rules and regulations concerning the reporting of venereal diseases and the establishment of standards of eligibility for services provided at State expense.

In a number of jurisdictions, regulatory functions of the State agency extend to administration of laws requiring compulsory examination of selected population groups for the purpose of determining their freedom from infectious venereal disease. Premarital examination laws are probably the best known of this type. By 1940, 24 States had enacted legislation requiring premarital health examinations, including a blood test for syphilis. These States are: Alabama, California, Colorado, Connecticut, Illinois, Indiana, Kentucky, Louisiana, Michigan, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Oregon, Pennsylvania, Rhode Island, South Dakota, Tennessee, Texas, Virginia, West Virginia, Wisconsin, and Wyoming. Twenty of these States require both the bride and groom to be examined, whereas 4, namely Alabama, Louisiana, Texas, and Wyoming, demand examination of the groom only. According to Peckham,[3] 6 additional States (Delaware, Maine, Nebraska, Oklahoma, Utah, and Vermont) prohibit the marriage of persons with venereal disease, even though they make no specification as to examination. At the same time, some of this group do require a personal affidavit as to freedom from infection. Enactment of premarital legislation began over twenty-five years ago. However, because the earlier laws were inadequate, their effectiveness as an approach to control of the venereal disease problem, particularly as it applies to syphilis, was minimized. Recently there has been a revival of interest in the possibilities of premarital legislation, if properly drafted. The first of the newer laws was passed by Connecticut in 1936.

Prenatal laws, which seek to reduce congenital syphilis by insisting that a serologic test be a part of the physical examination of every pregnant woman, were in operation in 19 States in 1940: California, Colorado, Delaware, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Massachusetts, Michigan, New Jersey, New York, North Carolina, Oklahoma, Pennsylvania, Rhode Island, South Dakota, and Washington.

Persons with an infectious venereal disease are definitely prohibited employment as food handlers in about two-fifths of the States. In about as many more, there are comparable regulations pertaining to

[3] Peckham, Charles H Jr Legal and therapeutic aspects of syphilis and pregnancy. J Am. Med. Assoc. 117:1863 (November 29, 1941)

employment as food handlers for persons with "any communicable or infectious disease." Whether venereal illnesses are included in this coverage is not specifically stated. Type and frequency of examination required, whether such tests are made routinely or upon suspicion only, and other related circumstances vary widely from State to State. A few States also impose restrictions upon one or more of the following groups: Employees of laundries, swimming-pool attendants, barbers, cosmetologists, nurses, domestic servants, and school teachers, janitors, bus drivers, and pupils.

Although the health department may have complete regulatory jurisdiction, in practice it frequently delegates enforcement power to local health officers who serve as agents of the State organization. In several States, responsibility is split between the health department and the department of welfare, State university or college, or an independent State hospital. Where this situation exists, however, the regulatory participation of the latter agencies does not extend to general law enforcement but is limited to defining the terms under which their services are made available to the public. Functions of the several departments of agriculture and of the dairy and food commission, hotel commission, State fire marshal, and department of conservation, which share regulatory powers in one State each, pertain to the employment of food handlers with venereal disease.

Enforcing treatment of infectious cases and quarantining recalcitrant patients are other regulatory measures which most State health departments are authorized to enforce. By one device or another attempts are made either to suppress or regulate prostitution—a practice which is recognized as the most prolific source of venereal diseases—and its repression is regarded as a public health measure. It is a common policy for State health departments to empower local health officers to examine, at their discretion, any person reasonably suspected of having a venereal disease in communicable form. Prostitutes and their associates are automatically included in this classification. Consequently, such persons are subject to examination to determine whether or not they are infected with communicable syphilis or gonorrhea. Those found to be so afflicted are required to submit to treatment until discharged and to observe any precautions required by the health authorities against transmission of infection. In the event that treatment is discontinued prematurely or that there is failure to cooperate in any other way, the State further empowers the local health officer to establish isolation or quarantine, under which conditions treatment is enforced. Noncooperative offenders of this type may be committed to county isolation hospitals, detention wards in county jails, State industrial schools for girls, or State detention homes or quarantine hospitals for women. About half of the States specifically charge representatives of the health depart-

ment to assist in every way the proper officials whose duty it is to enforce laws directed against prostitution.

Conceding that the attack upon venereal disease must be carried on at close range to be effective, health departments with varying degrees of activity engage in promotion of local programs of control. Whenever possible, the State agency operates through full-time local health units. However, it does not limit its promotional activities to areas having organized general health service. In the absence of official health facilities at the local level, the State agency stimulates local service through different types of voluntary agencies such as hospitals, medical societies, or public-spirited lay groups.

Closely integrated with—in fact, largely contributory to—the promotional function of the State organization, are the educational programs which it sponsors. Educational pursuits are planned for the benefit of both lay and professional groups by the health departments of practically all States. Notwithstanding, the types of educational work engaged in vary considerably. Distribution of literature—pamphlets, books, reprints, and the like—and lectures by staff members to representative clubs and organizations such as men's luncheon and service clubs, mothers' clubs, Y. M. C. A. and Y. W. C. A. members, and parent-teacher associations constitute the most common methods of acquainting the general public with facts regarding the prevalence of venereal diseases and possibilities for their control. Frequently the lectures are accompanied by amplifying films, slides, or exhibits. About half of the States extend their educational efforts beyond these organized community groups and approach the general public through the home, magazine and newspaper articles and/or radio programs being the chosen educational medium.

About four-fifths of the States adapt certain features of their educational undertakings to the curricula of high schools and teachers' colleges. In some instances, the State agency carries its instructional program into the schools only upon request of the local community; in others, one or more special educators are employed for routine instruction of high school and college youths in the various aspects of venereal disease control. Except in two States, these school programs are sponsored by the health department exclusively. In Indiana and Tennessee there are cooperative arrangements between the departments of health and education for inclusion of venereal disease control as a subject for consideration in the general health education of high school students. Educational projects cover both the preventive and curative aspects of venereal diseases.

State provisions for keeping private physicians currently informed on the latest developments in diagnosis and treatment of the venereal diseases range from distribution of literature, presentation of films, exhibits, and lectures before county medical societies, and occasional

private consultations, to the arranging and financing of formal refresher or post-graduate courses for them. Only about one-third of the States include the latter item in their plan for professional education, and even then both length and intensity of the courses vary considerably.

A very fertile field for activity of the State agency charged with venereal disease control lies in affording supervision and consultation to organizations operating direct service programs at the local level. All but two health departments function in this capacity; these are the Virgin Islands and the District of Columbia which do not represent true State organizations. Supervisory and consultatory aid extends to both the administrative and clinical phases of the problem, including suggestions for organizing and operating clinics and advice concerning follow-up measures as well as recommendations regarding diagnosis and treatment. Staff members of the State health departments offer advisory service to both official and nonofficial organizations. Their supervisory function, on the other hand, is largely confined to the venereal disease control activities of organized local health units or of facilities operating under other auspices which have been granted State aid. State supervision of local practices implies some measure of uniformity of procedures within a given State; yet closeness of supervision varies from one jurisdiction to another. To a considerable degree it is determined by the extent of State financial participation in services offered locally. In some instances, supervisory authority of the parent agency goes so far as to prescribe the course of treatment to be followed by its local subdivisions; in others, it is concerned merely with checking upon local observance of State regulations pertaining to submission of reports, eligibility of clients for service, and the like.

Reference to table 2 discloses that in contradistinction to actual State operation of services for local areas, three-fourths of the State health departments stimulate the venereal disease programs of local health organizations by extending financial aid. The funds allocated by State agencies to local units only partially represent State-appropriated moneys, of course, for the States have previously received a sizable portion of these grants from the United States Public Health Service and occasionally from private foundations or other voluntary organizations. Nevertheless, decision upon the method of expending available money rests with the State agency. Several varying plans or combinations thereof may be followed: Sometimes the total sum is administered directly by the parent body; again it is allotted to the subsidiary organizations for the purchase of actual service; in still other instances, it is used for drugs and supplies and these, in turn, are distributed to the local jurisdictions. The fact that 75 percent of the States make it a policy to distribute funds or drugs to local units

points to the current trend of thought in this matter. Obviously, by the device of subventions in the form of funds or supplies, States are encouraging provision of service at the local level—where the problem actually exists.

Purposes for which State grants to local health units are utilized, either separately or in combination, include nursing service for case-finding, clinic assistance, and follow-up work; diagnostic laboratory service; epidemiological investigations; and clinic facilities. Payment of clinicians' fees and provision of drugs used for treatment represent the specific items of local clinic expense which are most often supported by State subsidy. However, State grants are sometimes applied to the general operating expenses of local clinics. Inasmuch as this study was focused upon function of the respective State agencies rather than upon the volume of service which they render, no definite comparisons are made of the spread of State subsidy for local venereal disease activities. Whereas one State health department aids only one or two local clinics, another financially participates in the operation of many. Likewise, the number of nurses and laboratory technicians employed by local health units as a result of State allotments varies considerably. In other words, State subsidy is not traced to its ultimate application by the local health units, for such analysis would involve detailed description of activities at the local level. As previously mentioned, the survey was limited to facilities and services of State agencies only. It is understood, of course, that State subsidy of any particular local activity for venereal disease control does not preclude the State agency from providing the same kind of service directly at the State level in some other portion of the jurisdiction. Such a situation may or may not exist.

About two-fifths of the health departments depend upon the collection and analysis of routine reports from private physicians and local health officers to measure the incidence of the venereal diseases within the boundaries of their several States. Unfortunately, however, reporting is not always complete. Acknowledging this, the remaining 32 health departments conduct special surveys to obtain further information regarding the prevalence of syphilis. The fact that these special studies are largely limited to determination of the presence of syphilis rather than extended to include all venereal diseases is in complete accord with the general organization of the State venereal disease control programs. As stated earlier in this report, syphilis control measures are the essential components of these programs. Mass serologic testing of selected population groups—college students, inmates of county homes and State hospitals, W. P. A. workers, N. Y. A. applicants, and employees of various industries; random blood testing in stations set up at State and county

fairs; and statistical analysis of positive cases discovered by routine premarital, prenatal, and food-handler Wassermann tests are the most frequently employed case-finding techniques. The results obtained, when applied to the total population, serve the dual purpose of checking thoroughness of physician-reporting and providing additional detailed information regarding the rate and distribution of syphilis infection.

An essential element of syphilis case-finding activities is the availability of laboratory facilities for testing the blood samples collected. Although characteristic clinical symptoms manifest themselves, diagnosis cannot be regarded as complete or accurate without laboratory confirmation of the physical findings. It is obvious, therefore, that provision of free diagnostic laboratory service is an integral part, and one of the first considerations, of every syphilis control program. Without exception, some agency of State government, usually the health department, has accepted this responsibility. A few States have separate serology laboratories, but in most of them the work is done by the general public health laboratory. The diagnostic service rendered thereby is available to private physicians, clinicians, local health officers, and hospitals on much the same basis as laboratory service provided for the diagnosis of other communicable diseases. In most States, serologic service is afforded without restriction as to the patient's economic status. It should be stated at this point that laboratory facilities for venereal disease control, unlike certain other phases of the programs, are not confined to diagnosis of syphilis alone. While it is true that Wassermann, Kahn, and other tests for syphilis represent the major volume of laboratory service for venereal disease control, application of standard techniques for diagnosis of gonorrhea also constitutes an appreciable portion of the total volume of laboratory service. An additional related activity of many State public health laboratories is checking and approving the diagnostic procedures of private laboratories.

Inasmuch as control of venereal disease is largely contingent upon the cure of infected persons, State health departments without exception have undertaken to supply, free of charge, certain drugs essential to effecting such cure. The conditions under which these drugs are distributed vary. Whereas over three-fourths of the States make reporting of the case the only conditional factor in furnishing the required drugs, in the remaining jurisdictions State-supplied medicines are available to physicians for indigents only. Patients treated at public expense are included in the indigent groups, of course. The kinds of drugs offered by the several States include: neoarsphenamine, arsphenamine, acetarsone, tryparsamide, sulfarsphenamine, mapharsen, bimarsen, stovarsol, mercury, bismuth, iodides, and sulfonamides. From table 2 may be determined the relative frequency

of their distribution by groups during 1940. Most of the drugs listed are provided for the treatment of syphilis; however, the sulfonamides—which are supplied by about three-fourths of the States, but for a relatively small number of patients—are used in the treatment of gonorrhea. With discovery of the curative properties of sulfonamide compounds, State agencies are now actively laying plans to expand facilities for gonorrhea control to match those for syphilis control.

Because of the peculiar nature of syphilis infection, the actual treatment process extends over a long period of time and requires the service of a physician for administration. Consequently, provision of free drugs is only the first requisite for initiating treatment of syphilis patients who would not ordinarily seek medical care. Some arrangement with a physician for free administration of these drugs at regular intervals is equally as important if the patient is to be truly benefited. As a result, one of the most notable features of current programs is the provision, at State expense, of treatment facilities.

Clinics, affording both diagnostic and treatment services, have been chosen as the most practical arrangement for handling large numbers of patients. As mentioned earlier in the report, approximately three-fourths of the States foster clinic service by financially aiding local health units, which, in turn, are charged with all details of operation. The remaining States follow other policies for making treatment facilities available to venereal disease patients eligible for public care. Under one plan, the State agency is entirely responsible for all aspects of maintaining the clinic stations. Under another, clinics are organized and operated by local physicians, but the State agency compensates these clinicians directly, instead of indirectly through local health departments. As a matter of fact, the latter arrangement is not apt to prevail in areas which do not have organized local health services. Twenty-five State health departments, 5 State university or college hospitals, and 2 independent State general hospitals either operate or directly finance clinic facilities for diagnosis and treatment of venereal disease. Stationary clinics predominate when a State agency is the clinic sponsor. At the same time, several State health departments operate mobile treatment units. These clinic staffs, with their equipment and supplies, travel from point to point throughout designated portions of the State at regular intervals, administering treatment at each scheduled stop. Under this plan the complete clinic set-up is motorized. In a few other States, the direct service arrangement which exists may be described as maintenance of fixed clinics at permanent locations with clinicians attached to the central staff of the State agency making periodic visits to each in circuit rider fashion. Over half of the 25 health departments which furnish direct clinic service according to one of these plans also subsidize clinics operated by local health agencies. Approximately 90

percent of the persons served in these clinics have syphilis, while the remaining 10 percent are gonorrhea patients.

In only two jurisdictions is there complete lack of State participation in the provision of organized clinic facilities for the treatment of venereal disease. Even in these places, the State assumes some responsibility for treatment of the indigent. Here it is the policy of the health department to pay private physicians on a case or treatment basis for all medically indigent patients served in their offices. The practice of financing treatments given by private physicians in their offices is not confined to States which do not have clinic services. Indeed, nearly half of the health departments include this item among their measures for venereal disease control in communities without organized clinic facilities.

Thus it is seen that there are several schemes for offering, partly or wholly at State expense, treatment to venereal disease patients, and that one or all methods may be employed by a single State. It should be emphasized, of course, that there is marked diversity among the States in the spread and volume of such services. One clinic or over one hundred may be operated by the State agency under discussion; furthermore, there is no common pattern either in the patient load per clinic session or in the interval at which clinic sessions are held. Presumably, the extent of service offered directly by the State agency is influenced, at least partially, by complementary services provided at the local level. However, source material collected in connection with this survey did not reveal the exact weight of this component.

Reference to the previous edition of Public Health Bulletin No. 184 [4] reveals that there has been conspicuous growth since 1930 in State provision of treatment facilities for venereal disease. At that time, only 33 of the 48 States (information was not included for the District of Columbia, the Territories, and the Virgin Islands) furnished free treatments to indigents. In 1940, as previously stated, all jurisdictions operated some plan whereby such service was made available, either partly or wholly at State expense. Further evidence of expansion is found in the increased volume of health department service which now operates exclusively for venereal disease control. In 1930, 21 State health departments had special units of venereal disease control; the venereal disease programs of 20 States were associated with other health department activities; and 7 health departments engaged in no venereal disease activities whatever. In 1940, on the other hand, 36 health departments reported a special bureau, division, or section devoted to venereal disease work, while the remainder operated for this purpose through other branches of the organization.

Operation of prophylaxis stations is not reported as an activity of State agencies. However, one State health department is specifically

[4] See footnote 1

empowered to establish and support such stations when deemed necessary; two supply free prophylactic chemicals upon request; and another provides mechanical prophylaxis. On the whole, State participation in this phase of venereal disease control is limited to dissemination of printed instructions recommending personal prophylaxis for any person exposing himself to venereal infection. Even this form of service is reported by only seven States.

The epidemiological aspect of venereal disease control is not overlooked in concentrating upon the curative side of the problem, for case-finding also is stimulated through clinic activity. The practice of requesting patients applying for treatment to report suspected sources of infection and subsequent contacts is one method frequently employed for securing information leading to discovery of unknown cases. Persons thus listed who do not voluntarily apply for diagnosis or treatment are then investigated in an effort to have them submit to diagnostic tests for the protection of both themselves and the community. About two-thirds of the State health departments assign personnel to field investigations of venereal disease contacts. Nearly an equal number make certain types of diagnosed cases the focus of field investigation also, but there is little uniformity in the selection of cases to be followed up.

Experience has shown that clinic patients are apt to become irregular in attendance as soon as some improvement in their condition is noted, and long before a complete cure is effected. Consequently, it is a common policy of State health departments to conduct follow-up activities designed to seek continuation of treatment for these delinquent cases. Among those which lapse in clinic attendance, early infectious cases and pregnancies are the types to which State nurses, physicians, or social workers most often make follow-up visits for the purpose of urging continued treatment. In some jurisdictions, however, plan of organization—rather than type of case—is the selective factor governing the follow-up work of State health departments. For instance, a few States provide follow-up service for clinic cases only. Some confine their activities to areas having no corresponding local facilities. Still others restrict field investigations to cases reported by private physicians or even to cases under private treatment which have lapsed in attendance.

As pointed out repeatedly, the purpose of this discussion is to differentiate between the various administrative plans for venereal disease control inasmuch as it was not feasible to assemble data by which to demonstrate inequalities among the several States in extent or intensity of service. Therefore, in one State, the field work described may represent the efforts of a single investigator assigned to a lone county—or even smaller political subdivision—or operating from the central office for follow-up of special request cases only. In

another, it may portray the activities of a staff of several persons operating on a State-wide basis. It is likely, though not certain, that State field services are usually planned to supplement those provided at the local level.

Since hospitalization of venereal disease patients is largely a responsibility of local health jurisdictions, State figures reveal comparatively little on this subject. Only one-fifth of the State health departments include hospital treatment of venereal disease cases as an item in their complete control programs. Even in these States, hospitalization is a service only recently introduced and offered largely on an experimental basis for testing the efficacy of rapid intravenous drip therapy. Hospital facilities are also made available to venereal disease patients by five State university hospitals, three independent State general hospitals, a department of welfare, and a board of control. Admission of paretics and other cases of syphilitic insanity to State mental hospitals is not considered in this service category inasmuch as, under these circumstances, the patient is hospitalized because of his paralytic or mental state and not the venereal infection which preceded it. Neither are commitments to treatment wards of State industrial schools, detention homes, or farms included since the chief object of such facilities is isolation for enforced treatment such as is usually administered in clinics rather than provision of the special bed care or therapeutic devices usually accredited to hospitals.

In the light of data presented, it is obvious that venereal disease control is fundamentally a health department responsibility and that the efforts of all State health departments are aimed, first, toward diagnosis of previously undiscovered cases of venereal disease and, second, toward placing under treatment every case discovered. As to the most feasible methods of achieving these aims, there is still some disagreement. Primarily, State efforts in 1940 were largely concentrated upon the control of syphilis, with only minor attention directed toward the eradication of gonorrhea and other diseases of the venereal category.

EXPENDITURES FOR VENEREAL DISEASE CONTROL

Probably the most graphic medium available for measuring the relative efforts of the several States toward controlling their respective venereal disease problems is the financial expenditures which they make for this purpose. Earlier discussions devoted to expenditures for the control of general communicable disease and tuberculosis [5] emphasized the difficulty of arriving at a complete and accurate cost figure for any specific health problem. It was pointed out in these preceding articles that deficiencies in cost data are due largely to the

[5] See text footnote [2].

organizational and functional overlapping and interweaving of State agencies or their subdivisions and to the practice of including different items under like nomenclature in the various States. Therefore, for both general communicable disease and tuberculosis control, expenditures considered were restricted to those based on funds designated specifically for the problem under consideration.

Certain difficulties encountered in determining total expenditures apply to venereal disease control as well as to the other health services referred to. Most States, in addition to allocating established funds to venereal disease control as a separate entity, include some venereal disease activities under other service categories. Serological tests for syphilis constitute a major part of the work of the State diagnostic laboratory; assisting at venereal disease clinics and making home visits for the promotion of clinic attendance represent important duties of the public health nursing staff; training schedules arranged for various public health personnel encompass specialized instruction in venereal disease control; general public health education projects cover the field of venereal disease; and in most places some part of the venereal disease program is carried by the general framework of State and local health organization. From combined sources, it is impossible to determine the exact proportion of expenditures for services of these categories which should be charged to venereal disease control. At the same time, Federal venereal disease funds allotted thereto are identifiable; consequently, it is possible to go one step further toward arriving at an aggregate cost figure for State venereal disease activities than for health services of other types. In other words, from the standpoint of venereal disease control, the most precise expenditure figure available from this survey—which must still be regarded as an approximation—is composed of two elements: First, total funds expended for venereal disease activities designated as such and, second, *identified* venereal disease funds—notably Federal grants and contributions of voluntary health organizations—allotted to general health service. Within these limitations, table 3 presents the approximate gross and per capita annual expenditures of each State health department as interpreted by one or a combination of the functions termed: regulation, promotion and education, supervision and consultation, financial aid to subsidiary units, and direct service.

All funds disbursed by State health departments under the conditions set forth are recorded, irrespective of their source. As a matter of fact, Federal grants to health departments for venereal disease control represent approximately three-fourths of the aggregate amount expended for this purpose. Local participation, it will be recalled, is not covered by this report. The Federal allotments are distributed to the several States under authority of: (1) Title VI of the Social Security Act of 1935, and (2) the Venereal Disease Control Act of

TABLE 3.—*Approximate total and per capita expenditures* by State health departments for venereal disease control in each State and Territory, the District of Columbia, and the Virgin Islands during the fiscal year 1939–40*

State or Territory	Approximate expenditure* for venereal disease control		State or Territory	Approximate expenditure* for venereal disease control	
	Total	Per capita		Total	Per capita
Total	$5,104,100	$0.039	Nevada	$6,600	$0.060
			New Hampshire	20,800	042
Alabama	162,600	.057	New Jersey	137,100	.033
Arizona	15,200	.030	New Mexico	23,000	.043
Arkansas	111,700	.057	New York	368,900	.027
California	247,000	.036	North Carolina	330,000	.092
Colorado	36,500	.032	North Dakota	9,700	.015
Connecticut	48,400	.028	Ohio	139,300	.020
Delaware	9,600	.036	Oklahoma	91,900	.039
District of Columbia	65,200	.103	Oregon	32,100	.029
Florida	72,200	.038	Pennsylvania	275,600	.028
Georgia	185,000	.059	Rhode Island	18,100	.025
Idaho	15,600	.030	South Carolina	122,200	.064
Illinois	314,900	.040	South Dakota	12,300	.019
Indiana	98,300	.029	Tennessee	143,600	.049
Iowa	73,800	.029	Texas	260,400	.041
Kansas	52,700	.029	Utah	19,600	.036
Kentucky	106,600	.037	Vermont	19,000	.053
Louisiana	105,000	.044	Virginia	106,300	.040
Maine	22,100	.026	Washington	42,300	.024
Maryland	59,600	.033	West Virginia	44,400	.023
Massachusetts	342,800	.079	Wisconsin	110,200	.035
Michigan	138,400	.026	Wyoming	2,400	.010
Minnesota	79,200	.028	Alaska	3,700	.051
Mississippi	146,000	.067	Hawaii	15,200	.036
Missouri	106,800	.028	Puerto Rico	113,200	.061
Montana	6,000	.011	Virgin Islands	1,800	.072
Nebraska	13,200	.010			

*Expenditures for the services considered represent index rather than absolute amounts; they include expenditures allocated specifically to venereal disease activities as such plus *identified* venereal disease funds

disbursed by State health departments are recorded, irrespective of their source.

1938. Financial figures for the fiscal year 1940 were selected as being the most representative measure of the service described in the foregoing section of this report. Expenditures of State agencies other than health departments are not included because their participation in venereal disease services is so interrelated with other health activities that their records did not permit segregation of funds expended specifically for this purpose.

During the fiscal year 1940, venereal disease programs of State health departments cost in the aggregate more than 5 million dollars for the country as a whole. Of this amount, over 45 percent was expended directly by the State agencies for activities conducted exclusively for eradication of venereal disease, and about 40 percent was distributed to local health units for partial support of venereal disease programs operated by cities, counties, or other political subdivisions. This latter sum, of course, does not represent the full cost of services offered locally, but only the State agency's contribution to those services. A relatively small amount, less than 15 percent of the total expenditure, was assigned to venereal disease control listed under related State health department services, particularly local health

administration, general communicable disease control, diagnostic laboratory service, general health education, public health nursing activities, and training of public health personnel.

When the situation is viewed from the standpoint of the individual States, it is found to be characterized by extreme contrast. Among the several jurisdictions, the expenditure range extends from less than $2,000 to over $300,000, with the State occupying the median position reporting a total outlay of $72,200. That some of this disparity may be explained by variation in the accounting practices of the several States is acknowledged. Nevertheless, marked differences in the content and coverage of State programs for venereal disease control are suggested also. Because of differences in State population, however, true diversities are not revealed until total expenditures are converted to expenditures per capita. According to table 3, extremes in per capita expenditures for State venereal disease services are defined by $0.103 and $0.010, typifying a ratio of 10 to 1; $0.036 represents the median and $0.039, the average per capita expenditure.

Search for causes of these differences led to consideration of the influence of several State characteristics. Purchasing power of the State as defined by per capita income [6] yielded no explanation of the differences in expenditures for venereal disease control, but location of a State within a particular geographic section of the country [7] (Northeastern, Southern, Central, and Western representing the geographic areas used for comparison) appeared to have some bearing upon the situation. Per capita disbursements of States in the Southern region ran considerably higher than did those of any other section, while the Central States expended relatively less than did any other area. The median per capita expenditure of each group of States classified according to geographic location is as follows: Southern, $0.046; Northeastern, $0.033; Western, $0.030; and Central, $0.028. Further investigation was made to determine whether magnitude of the problem within the individual States might be the underlying factor governing the geographic differences noted.

That there is significant difference among the several States with respect to the venereal disease problem has been emphasized by

[6] Martin, John L, National Income Division, Department of Commerce Income Payments to Individuals by States, 1929–39 Survey of Current Business, October 1940

[7] Mountin, Joseph W, Pennell, Elliott H, and Pearson, Kay The distribution of hospitals and their financial support in southern States Southern Med J, Vol 33, No 4, April 1940

The established geographic areas with the States contained therein are as follows

Northeastern Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia

Southern Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas

Central Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas

Western Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, and California.

Vonderlehr and Usilton[8] in a report of the prevalence of syphilis among the first million men examined under the Selective Service Act of 1940. According to these data, the incidence rate per 1,000 selectees and volunteers examined ranges from 5.8 in New Hampshire to 170.1 in Florida. Using the rates established from this study as a measure of the venereal disease problem within the individual jurisdictions, the States were arrayed in descending order and divided into quarters. The median per capita expenditure for venereal disease control was then determined for each quarter.

From this procedure it was found that during the fiscal year 1939–40 States of the group having the greatest venereal disease problem expended relatively twice as much for venereal disease control as did States of the group having the least serious problem, the median per capita expenditures being $0.057 and $0.028, respectively. Furthermore, per capita expenditures of the second quarter of States, arranged according to their problems, fall between those of States having either the highest or lowest syphilis rates. True, decrease in expenditure does not absolutely accord with the drop in prevalence, for the median per capita expenditure by States of the third quarter is slightly less than that made by States of the quarter ranking lowest in the venereal-disease-problem scale. Nevertheless, this deviation from the general trend is not sufficient to alter the conclusion that, for the most part, extent and intensity of service afforded by State agencies for venereal disease control are related to extent and intensity of the problem itself. At least, the 50 percent of the States with the most serious problem expend appreciably more than do the corresponding proportion where the prevalence rates are lower.

As reported in 1930, State health departments expended in the aggregate less than a half million dollars for venereal disease control. At that time, of course, no Federal aid was available and the entire financial burden was borne by State legislative bodies.

DISCUSSION

Activities carried on by State agencies for venereal disease control have markedly expanded during the past decade. Federal grants and recognition of the true magnitude of the venereal disease problem have acted as effective stimuli to increased activity by State agencies for venereal disease control. Without exception, the health department is the official State agency charged with major responsibility for this field of work, but in some States the department of welfare, department of education, State university hospital, independent State hos-

[8] Vonderlehr, R. A., and Usilton, Lida J.: Syphilis among selectees and volunteers—Prevalence in first million men examined under the Selective Service Act of 1940. J. Am. Med. Assoc., 117:1350 (October 18, 1941).

pital, or independent State laboratory supplements the efforts of the health department.

Venereal disease programs of 1940 stress activities designed to reduce the prevalence of syphilis, but in comparison relatively little is done toward regulating the spread of gonorrhea. That improved case-finding and complete treatment are the two essential elements of syphilis control appears to be the consensus of administrators charged with the several State programs. Notwithstanding, the methods of administering these control measures vary with the individual States. Law enforcement is a weapon consistently employed, while promotional and educational activities, likewise, are engaged in by all State health departments. In addition, the extension of supervisory and consultatory service to local health organizations is a practice quite uniformly followed.

Basic differences among the States hinge upon the portion of their program which is administered directly by State personnel and the portion that is delegated to local jurisdictions but partially supported by the State agency. Instead of offering service directly, one-half of the State health departments function through local health units by distributing to them financial assistance for clinic service; nearly one-fifth of the State agencies either maintain their own clinics or immediately aid in the support of those under other sponsorship; and over a fourth follow a combined procedure. Inquiry regarding the extent and intensity of clinic service arranged for by the State agency was not featured in this study, nor was the degree to which State service of any kind is influenced by complementary local programs fully determined. Nevertheless, it is indicated that the amount of State service offered is largely contingent upon needs unmet by local health agencies. In only two jurisdictions does the State health department fail to participate in any way in clinic service for the diagnosis and treatment of venereal disease; here, the State agency finances, on an individual basis, the treatment of indigent patients by private physicians in their offices.

Astounding growth has marked the development of State venereal disease programs during the past ten years.[9] Currently, the State agency without exception both finances—either partly or wholly, and either directly or indirectly—professional care afforded indigent venereal disease patients and supplies the drugs used in their treatment. In 1930, only 33 States participated in any way in provision of treatments for indigents. The most recent survey revealed that free diagnostic laboratory service was offered without economic restriction by all but three health departments; ten years ago 41 States reported the availability of similar service. The volume of both

[9] See footnote 1.

diagnostic and treatment service has been greatly expanded in all instances. As to expansion of epidemiological activities, precise comparative data are not available. However, it is quite reasonable to assume that State participation in this field of work has been enlarged also as a result of increase in the number of personnel employed. The present status of epidemiology as applied to the venereal diseases, and particularly to syphilis, may be defined as follow-up of cases which have lapsed treatment and contacts, with special attention focused upon early infectious cases and pregnancies.

Much of the contrast cited is attributable to Federal leadership and financial aid. Further evidence of expansion in State activities for venereal disease control is found in the expenditures reported in the two surveys. The most recent data point to an aggregate annual expenditure of over 5 million dollars for the venereal disease control activities of all State health departments. This figure represents a per capita expenditure of $0.039. It encompasses only activities which could be described specifically as venereal disease measures and identified venereal disease funds allotted to related activities of State health departments or to local health units. It does not take into account items which are hidden under other designations. The corresponding expenditure figures for 1930 were: aggregate, $436,600; per capita, $0.004. Wide divergence obtains among the several jurisdictions in their outlay for venereal disease control, but, to a large extent, expenditures are related to the seriousness of the problem in in the respective States.

A NEW BASE FOR THE PROTECTIVE OINTMENT FOR THE PREVENTION OF POISON IVY DERMATITIS

By Louis Schwartz, *Medical Director*, John E. Dunn, *Passed Assistant Surgeon*, and F. H. Goldman, *Chemist, United States Public Health Service*

Schwartz, Warren, and Goldman prepared an alkaline vanishing cream containing a nonirritant oxidizing agent, such as sodium perborate or potassium iodate, and stated that it was an effective preventive against poison ivy dermatitis.[1] Shelmire failed to confirm these results.[2]

Schwartz et al. stated that the cream should be freshly prepared in order to be effective because the oxygen was continuously liberated and the cream lost much of its efficacy after 2 weeks. This fault in

[1] Schwartz, Louis, Warren, Leon H., and Goldman, Frederick H. Protective ointment for the prevention of poison ivy dermatitis Pub Health Rep 55: 1327 (July 26, 1940) (This perborate vanishing cream, modified by the addition of tragacanth, 4 percent, is now also being successfully used as a protective against and curative ointment for tetryl dermatitis)

[2] Shelmire, Bedford Sodium perborate ointment and poison ivy dermatitis. J. Am. Med. Assoc., 116: 681-683 (Feb 22, 1941).

the cream made it impracticable to manufacture for commercial purposes because it would necessarily remain on the shelves of drug stores over an extended period. In order to remedy this fault, experiments were undertaken to develop an ointment base in which the oxidizing agent would remain stable for a reasonable length of time, and yet would give up its oxygen readily under the conditions existing when it is applied to the skin.

It will be noted from a review of the experiments described in the original article (see footnote 1) that the protection afforded by the detoxifying action of sodium perborate is relative and not absolute. There are three variable factors that determine whether a reaction of the skin will occur in any experimental test of the protective value of sodium perborate against the active principle of poison ivy. These are: (1) the amount of the active principle of poison ivy used in the experimental test; (2) the amount of sodium perborate available to act on the active principle of poison ivy; and (3) the degree of sensitivity of the experimental subject. Unfortunately, there are not as yet satisfactory methods for measuring quantitatively the first and last of these three factors.

Briefly, (1) the active principle of poison ivy can be detoxified when subjected to oxidation by a chemical agent having an oxidation potential of the order of sodium perborate; (2) when sodium perborate is properly incorporated in a suitable ointment base, it has an oxidizing effect on poison ivy coming in contact with it and acts as a protective coating on the skin of persons sensitive to poison ivy under conditions of natural exposure, if certain rules for its use are observed.

In regard to the first statement, evidence was presented in the original article to show that sodium perborate and potassium periodate can detoxify the active principle of poison ivy in an acetone-aqueous medium. The following experiment was done in confirmation of these results.

Experiment 1.—One part of the stock solution of poison ivy extract (Lederle extract containing 130 mg. of oleoresin per cc. of acetone) was diluted with 64 parts of acetone. To a portion of this diluted extract was added an equal amount of a saturated aqueous solution of sodium perborate and to this mixture was added a small excess of sodium perborate powder. The final mixture, containing 1.0 mg. of oleoresin per cc., was allowed to stand 15 hours. At the end of this time a portion of the solution was tested with potassium iodide crystals. A brown color of free iodine resulted, indicating that unreduced sodium perborate was still present in the solution. Two individuals sensitive to poison ivy were then tested with this solution by dipping a cotton applicator in the solution and painting a streak about 1 inch long on the anterior aspect of one arm of each subject.

Previously each of these subjects had given a positive reaction to an acetone dilution of the stock poison ivy extract containing 1.0 mg. of the oleoresin per cc., when applied in a similar manner. In this experiment no reactions resulted from the application of the poison ivy extract treated with sodium perborate.

Later, two highly sensitive subjects were selected for testing who had been shown previously to be sensitive to an acetone dilution of the stock poison ivy extract containing 0.25 mg. of oleoresin per cc., when applied with a cotton swab to an area approximately 3 cm. by 6 mm. on the anterior aspect of the arm.

Because of the inexactness of the dosage of the oleoresin when applied in this manner, a different technique was developed for applying solutions to the skin. A hole 1.5 cm. in diameter was cut in a lead sheet ⅛ inch thick, the area of this hole corresponding to the area 3 cm. by 6 mm. covered when solutions were applied with a cotton swab. Melted paraffin was spread around the hole on one surface, and this surface was then placed on the area of skin selected for testing. The paraffin was used to prevent the solution placed on the skin area visible through the hole from "creeping" under the lead plate. One-tenth of a cc. of the solution being tested was flowed from a pipette onto the skin area exposed through the hole in the lead sheet, and the lead plate was held in place until the solution had dried. A current of air from an air line was used to hasten drying.

One cc. of the solution of poison ivy extract, containing 1.0 mg. of oleoresin per cc. and which had been treated with an excess of sodium perborate, was mixed with 3 cc. of a saturated aqueous solution of sodium perborate. This mixture then contained 0.25 mg. of oleoresin per cc. Using the perforated lead sheet according to the technique described above, 0.1 cc. of this solution was applied to the anterior aspect of the arm on each of the two subjects. No reaction resulted from these tests.

From this experiment it may be said that sodium perborate is capable of detoxifying the active principle of poison ivy. In the experiments cited in the original article (see footnote 1), the detoxification of the poison ivy extract, when treated with sodium perborate, was not always sufficient to reduce the concentration of the active principle below the threshold concentration of the subject being tested. This was due to the high concentrations of poison ivy extract used. When the concentration of the extract is reduced to a level more nearly approaching the patient's threshold, sodium perborate is capable of detoxifying a sufficient amount of the active principle so that no reaction occurs. It is felt that these concentrations are more nearly comparable to the conditions of natural exposure as well. Other investigators agree that the active principle of poison ivy can

be destroyed with sodium perborate [3] and hydrogen peroxide.[4] Hydrogen peroxide and sodium perborate are comparable in their oxidation potentials.

In regard to our second statement, namely, that when sodium perborate is properly incorporated in a suitable ointment base it is effective as a protective coating on the skin of persons sensitive to poison ivy under conditions of natural exposure if certain rules for its use are observed, it is now possible to report on the results of certain field trials. Before describing these practical demonstrations, however, additional experimental work relating to this point will be cited:

Experiment 2.—A group of 17 individuals sensitive to poison ivy agreed to act as subjects for a study of the value of the oral administration of poison ivy extract for desensitization. Preliminary to the administration of the poison ivy extract each subject was patch tested with various dilutions of poison ivy extract in corn oil to determine his degree of sensitivity. The dilutions of poison ivy extract in corn oil [5] used were: 1:5000, 1:1000, and 1:500. Those individuals who gave a history of extreme sensitivity to poison ivy were not tested with all dilutions, but in each case a positive reaction was obtained with at least one dilution. The patch-test procedure consisted of taking a swatch of close-woven gauze, approximately ¼ inch square, and placing it on the skin of the ventrum of the forearm. One drop of extract was placed on the gauze, and over this was placed an adhesive plaster strip with a cellophane disc in its central portion to overlie the gauze patch. Patch tests were removed at the end of 24 hours and the patch tests observed for reactions. Readings were made on the succeeding two days following removal of the patch.

At the time these patch tests to determine the degree of sensitivity of the experimental subjects were performed, similar patch tests were applied to the ventrum of the other forearm on skin areas protected with a layer of sodium perborate ointment. Two different ointment bases, each containing 10 percent sodium perborate, were used, one ointment base being used on 11 persons, and the other on 6. Not all dilutions of the poison ivy extract were used in this series of patch tests, but in the case of each individual at least one dilution was used which caused a reaction on the unprotected skin of the other forearm. In the case of 11 subjects no reactions occurred at the site of patch tests where the skin was protected with sodium perborate ointment. Six individuals gave positive reactions to the patch tests placed over protective ointment, but in each case these reactions were

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[3] Gisvold, Ole: The effect of some adsorbents, precipitants, and oxidants upon the resin of Rhus toxicodendron. J Am. Phar. Assoc., 30 17-18 (January 1941).

[4] Zwick, Karl G.: Notes on cutaneous hazards from phanerogamous plants. Med. Bull., University of Cincinnati, 8 69-78 (February 1941).

[5] Supplied by Lederle Laboratories.

less than the reaction for the corresponding dilution on the unprotected skin. There was no apparent difference in the effectiveness of the two ointments.

Experiment 3.—A 10-percent sodium perborate ointment was prepared in the laboratory by mixing an appropriate amount of finely ground sodium perborate powder with an ointment base. The ointment base and the ointment base containing the sodium perborate were then spread on the skin of the arm of a subject who had previously been shown to be sensitive to an acetone dilution of the poison ivy extract containing 1.0 mg. of the oleoresin per cc. A cotton applicator was then dipped in an acetone solution of poison ivy extract of this dilution and wiped over the two areas covered with the ointment base and the perborate ointment, respectively. The areas wiped with the swab measured 3 cm. by 6 mm. Several hours later the ointment base and the perborate ointment were washed off the skin. No reaction occurred at the site of the perborate ointment, but an erythematous streak appeared in 48 hours at the site of the ointment base alone.

This subject was again tested with a 10-percent sodium perborate ointment, using the lead sheet for controlling the skin area tested according to the technique previously described. A skin area was coated with the perborate ointment and the perforated lead sheet laid lightly on top of the ointment. A tenth of a cc. of an acetone dilution of the poison ivy extract containing 1.0 mg. per cc. was than placed on the ointment-protected skin exposed in the perforation of the lead sheet. The acetone was allowed to evaporate and then the lead plate was removed. In removing the plate, some of the ointment was pulled off the skin at one point in the circumference of the hole. The ointment was washed off the arm with soap and water 2 hours later. A slight, crescentic, erythematous reaction occurred 48 hours later at a point corresponding to the point where the ointment film was broken in removing the lead plate, but the rest of the test area showed no reaction.

These experimental results support the contention stated above, and confirm the work reported in the original article.

FIELD TRIALS

In order to test the practicability of the poison ivy protective ointment where used under conditions for which it was intended, arrangements were made for field trials in two government camps where work was being done on reclamation projects, and in a boys' summer camp.

Two different ointment bases were used for preparing the poison ivy cream supplied to the government camps and these bases will be

commented on in the discussion of the new formula. In one camp, the men working in areas infested with poison ivy were divided into two groups of about 20 men each. One group was given the protective ointment containing one base, and the other group was given the ointment containing the other base. During the poison ivy season there were only four cases of poison ivy dermatitis in this camp. Two of the patients were workmen who were not using the protective ointment because they normally were not exposed to poison ivy in their work; these two acquired their dermatitis through inadvertent contact with poison ivy. Upon investigation, the other two patients were found not to have used the protective ointment according to directions. Many of the men working in the camp during 1941 had been in the camp in 1940 when there had been 23 cases of poison ivy during the season. The growth of poison ivy in the locality was said to have been more luxuriant in 1941 because of heavier rainfall.

In the other camp where the poison ivy protective ointment was given a field trial, there were 47 cases of poison ivy dermatitis during 1941, of which only 7 were of sufficient severity to require the attention of a physician. The average number of employees during the year was 380, which gives an incidence of poison ivy dermatitis of 12.4 percent, as compared to an average incidence of 36.9 percent during the previous 2 years. Many of the cases of poison ivy dermatitis that did occur during 1941 were among new employees who did not use the protective ointment properly; other cases occurred among those who, for one reason or another, were exposed to poison ivy at a time when they were not using the ointment.

Because of the favorable experience in the use of the poison ivy protective ointment in these two camps, the Bureau of Reclamation is planning to supply this ointment to all projects where exposure to poison ivy, poison sumac, and poison oak occurs. (See addendum 4.)

The boys' camp used the protective ointment on about 20 men who were employed in the spring of 1941 to clean up the camp grounds and remove poison ivy. Five of these were reported to have had mild attacks of poison ivy dermatitis. The previous spring nearly all the men had been affected. Information is not available as to how closely instructions regarding the method of using the ointment were followed. The use of the protective ointment by the children at the camp was found to be impracticable because they could not be depended upon to use the ointment properly.

It was the consensus of those who had direct supervision of the use of the poison ivy protective ointment in these camps that the ointment does afford protection when it is properly used. A number of persons,

most of them being physicians and scientific personnel at the National Institute of Health, who were furnished this protective ointment for use while clearing poison ivy from their gardens and residential property, also reported that it had been used with success.

NEW OINTMENT BASE

Two formulas were used in making the poison ivy protective ointment for the field trials.

Formula 1

	Percent
Castor oil	21 5
Olive oil	21 5
Lanolin, anhydrous	21 5
Diglycol stearate	12 9
Paraffin, refined	8 6
Boric acid	2 0
Sodium perborate	10 0
Duponol WA pure	2 0

Formula 2

	Percent
Cetyl alcohol	35 1
Stearyl alcohol	5 3
Ceresin	3 5
Castor oil	20. 8
Mineral oil	21 9
Duponol WA pure	1 7
Sodium perborate	10 0
Boric acid	1 7

Both of these ointment bases were satisfactory from the standpoint of physical properties, and the sodium perborate was more stable in either of them than it had been in the vanishing cream base originally used (footnote 1).

The formula for the first ointment has a greasier base than the second. The ointment base for the second formula is a modification of one suggested by Mr. George C. Schicks, assistant dean of Rutgers University,[6] and has the advantage of being less greasy and for that reason more pleasant to use than the first ointment suggested. In the field trials, however, it was reported that the first ointment was more stable in extreme summer heat than the second, and that it was necessary to keep the second ointment stored in a cool place until used. The two were equally effective, however, as protectives against poison ivy.

In preparing ointments containing sodium perborate, special care must be exercised in adding the sodium perborate, as it is so rapidly broken down by heat. Water must be eliminated from the ointment base because this will also cause the perborate to break down.

[6] Personal communication

SUMMARY AND CONCLUSIONS

The contention that sodium perborate can detoxify the active principle of poison ivy in an acetone-aqueous medium is confirmed.

Further experimental evidence and the results of field trials are presented to support the contention that a suitable ointment base containing sodium perborate is an effective preventive against poison ivy dermatitis when certain rules for its use are observed. It must be remembered that this ointment will neutralize only as much poison ivy as there is available oxygen on the skin contacted; therefore a thick layer of the ointment is advised. Clothes must be removed after exposure before the ointment is washed off, otherwise the unprotected skin may be exposed to clothes which have been contaminated. Before clothes are again worn, they must be decontaminated. Tools and instruments which have been used in cutting poison ivy must be decontaminated before being used again. Decontamination can be effected by washing or immersing for 15 to 20 minutes in a 1 percent solution of calcium hypochlorite.

There are presented and discussed two new formulas for sodium perborate ointment in which the sodium perborate will retain its oxygen for several weeks if kept in a closed container, but will liberate it when exposed to perspiration or water.

ADDENDUM 1

FEDERAL WORKS AGENCY

WORK PROJECTS ADMINISTRATION

Bismarck, North Dakota

BUFORD-TRENTON IRRIGATION PROJECT

THOMAS H MOODIE
State Administrator

June 26, 1941.

To: Dr. Louis Schwartz, *Medical Director, U. S. Public Health Service*
From: John A. Harter, *Project Safety Inspector*
Subject: Poison Ivy Protective Cream

We received the shipment of protective cream and have been using it according to directions.

Since the first of May we have had an average of from 20 to 30 men working in poison ivy infested areas. These are the men we have been using the cream on.

To date we have not had a single case of poison ivy, and this compares with 11 reported cases at this time last year, 3 of which were doctor's cases and involving some lost time and medical expense.

At the end of the season I will be able to furnish you with complete figures for the 2 years, but I would say at this time that there is evidence of a very decided decrease in infection due to the use of the protective cream.

Yours very truly,

(Signed) JOHN A. HARTER,
Safety Inspector.

ADDENDUM 2

U. S. BUREAU OF RECLAMATION

BUFORD-TRENTON PROJECT

October 14, 1941.

From: Project Safety Engineer
To: Resident Engineer
Subject: Poison Ivy Protective Cream

1. During the season of 1941 we used the protective cream only on the men who were working daily in poison ivy infested areas.

2. While the total number of men working on the project was somewhat smaller for the season of 1941 than for 1940, there were approximately the same number working in infested areas, so the comparison for the 2 years is a fairly accurate one.

3. During the season of 1940 we had 23 reported cases of poison ivy infection, 4 of which were treated by a doctor. During the season of 1941 we had 4 reported cases, none of which were serious enough to require medical treatment. It should also be noted that of the 4 cases this year, 2 were of men not using the protective cream.

4. I have been advised by local doctors and druggists that there were more severe cases of infection this year than last, probably due to the fact that more than normal rainfall has produced an excessive growth of the plant.

5. Unquestionably, the use of the protective cream on the project this season has shown positive results.

JOHN A. HARTER

ADDENDUM 3

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

Redding, California

November 13, 1941

Memorandum to construction engineer
(F. I. Ross)
Subject: Accident Prevention Program—Prevention and Treatment of Poison Ivy, Poison Oak, and Poison Sumac Cases

1. Reference is made to the Acting Chief Engineer's letter of November 3, 1941, requesting reply to the Acting Commissioner's letter of October 29, 1941, on the above subject.

2. Item (b) of the Acting Commissioner's letter of October 29, 1941, reads as follows.

(b) How does the 1941 record of the number and severity of poison oak cases on the Kennett Division compare with that of 1940 and previous years?

Statistical report and analysis

	1938	*1939*	*1940*	*1941*	*Total*
Average number of employees	200	283	327	380	298
Estimated number of first-aid cases	No record	120	75	40	235
Number of medical cases	16	20	10	7	53
Number of lost-time cases	1	4	1	3	9
Number of days lost	6	11	4	9	30

There is a noticeable reduction in the number of medical cases in comparison to the number of men employed. The records indicate that the 7 medical cases and 3 lost-time cases in 1941 could have been avoided by proper use of preventions and first-aid treatment. These cases were the results of new employees being exposed to poison oak without adequate or proper instruction as to the necessary precautions, preventive measures, and personal hygiene. Therefore had the protection cream (base "77") which was available been used as directed and subsequent necessary first-aid treatment rendered, the reduction in medical cases would have been far more favorable and would have more definitely established the value of the protective cream.

3. Item (c) of the Acting Commissioner's letter of October 29, 1941, reads as follows.

(c) Statement is made by Mr. Ross that base "A" cream lost its oxygen content rapidly at high temperatures. Were the temperatures at which the cream "A" began to lose its oxygen noted?

The temperatures were not noted in the warehouse where the cream was stored. The temperature in the field was from 75 to 90 degrees and the base "A" cream liberated its oxygen content within 2 to 6 hours when exposed to these temperatures.

4. Item (d) of the Acting Commissioner's letter of October 29, 1941, reads as follows:

(d) For what maximum temperatures could the "A" and "77" creams each be considered effective?

Experience indicates that the base "A" cream cannot be stored or used under conditions where temperatures exceed 70 degrees and it is entirely too sensitive for practical field use. The base "77" in small containers (not to exceed 6 ounces) can be stored and used under summer weather conditions in areas where the temperature ranges from 75 to 115 degrees.

The reasons for the small containers are:

(1) So that the amount of cream taken out into the field will only be a 1-day supply.

(2) The cream is less sensitive to heat and liberates its oxygen content slower when it is placed in small containers (not over 6 ounces).

F. I. Ross,
Safety Engineer.

ADDENDUM 4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

Office of Chief Engineer — *Customhouse, Denver, Colorado* — *October 21, 1941.*

From: Acting Chief Engineer.
To: Commissioner.
Subject: Accident Prevention Program—Prevention and Treatment of Poison Ivy, Poison Oak, and Poison Sumac Cases.

1. Reference is made to the Acting Commissioner's letter of October 8, 1941, on the above subject.

2. There are enclosed copies of reports prepared by the safety engineers on the Buford-Trenton project and the Kennett Division of the Central Valley project concerning their experience with the use of the protective cream which was

furnished by the Public Health Service, and also a copy of a circular issued to the employees on the Kennett Division on the subject of poison oak.

3. It will be noted from these reports that the use of the protective cream brought favorable results on both projects where it was given a trial.

4. It is suggested that arrangements be made, through the Public Health Service or otherwise, to make this protective cream available to all of the projects where poison ivy, poison oak, or poison sumac is prevalent.

In dupl.
Encs.

WALTER R. YOUNG.

DISABLING MORBIDITY AMONG INDUSTRIAL WORKERS, FINAL QUARTER OF 1941 [1]

By W. M. GAFAFER, *Senior Statistician, United States Public Health Service*

The accompanying data are derived from analyses of periodic reports on sickness and nonindustrial injuries causing disability lasting more than one week among over 200,000 male members of industrial sick benefit associations, group insurance plans, and company relief departments.

Final quarter of 1941.—A comparison of the rates for the fourth quarter of 1941 with the corresponding rates for 1940 reveals a 35 percent increase in the frequency of bronchitis, over a 20 percent increase in diseases of the stomach, except cancer, and about a 15 percent increase in appendicitis. In fact the fourth quarter rates for 1941 covering these three causes are the highest yielded during the past 10 years, 1932–41. When the rates are related to the appropriate means for the 10 quarters the following percentage excesses result: bronchitis, 38 percent; diseases of the stomach, except cancer, 22 percent; and appendicitis, 35 percent.

The year 1941.—A number of causes show unusually high rates for both 1941 and 1940. It is of interest to compare the rates for 1941 with the means of the corresponding rates covering the past 10 years. The causes together with their percentage excesses include pneumonia, 42 percent; bronchitis, 33 percent; and appendicitis, 24 percent. It is noteworthy also that the 1941 rates for these three causes have never been equalled or exceeded during the 10 years under examination. Finally the rate for all disabilities, 101.8, is the highest recorded for the 10-year experience, the rate being 12 percent in excess of the 10-year mean (90.6).

[1] From the Division of Industrial Hygiene, National Institute of Health. The report for the third quarter appeared in PUBLIC HEALTH REPORTS, 56: 2428–2429 (December 19, 1941).

TABLE 1.—*Frequency of disabling cases of sickness and nonindustrial injuries lasting 8 consecutive calendar days or longer among MALE employees in various industries, by cause, the fourth quarter of 1941 compared with the fourth quarter of 1940, and the full year of 1941 compared with the full years 1936–40, inclusive*

Cause (numbers in parentheses are disease title numbers from the International List of Causes of Death, 1939)	Annual number of cases per 1,000 males				
	Fourth quarter		Full year		
	1941	1940	1941	1940	1936–40
Sickness and nonindustrial injuries [1]	92.5	85.5	101.8	96.7	92.1
Nonindustrial injuries (169–195)	12.1	12.1	11.9	11.8	11.3
Sickness	80.4	73.4	89.9	84.9	80.8
Respiratory diseases	32.6	30.5	41.2	37.8	34.7
Influenza and grippe (33)	11.9	12.8	19.0	17.4	16.1
Bronchitis, acute and chronic (106)	6.2	4.6	5.7	5.3	4.7
Diseases of the pharynx and tonsils (115b, 115c)	4.3	4.2	5.5	4.9	4.8
Pneumonia, all forms (107–109)	2.8	2.7	3.7	3.5	2.9
Tuberculosis of the respiratory system (13)	.5	.7	.7	.7	.8
Other respiratory diseases (104, 105, 110–114)	6.9	5.5	6.6	6.0	5.4
Nonrespiratory diseases	44.7	41.0	45.6	45.0	43.7
Digestive diseases	15.4	12.7	15.3	14.4	13.8
Diseases of the stomach except cancer (117, 118)	4.4	3.6	4.2	3.9	3.8
Diarrhea and enteritis (120)	1.4	1.1	1.5	1.3	1.2
Appendicitis (121)	5.4	4.7	5.2	5.1	4.5
Hernia (122a)	1.4	1.1	1.5	1.5	1.6
Other digestive diseases (115a, 115d, 116, 122b–129)	2.8	2.2	2.9	2.6	2.7
Nondigestive diseases	29.3	28.3	30.3	30.6	29.9
Diseases of the heart and arteries, and nephritis (90–99, 102, 130–132)	3.4	4.3	3.9	4.5	4.2
Other genitourinary diseases (133–138)	2.4	3.0	2.4	2.8	2.4
Neuralgia, neuritis, sciatica (87b)	2.1	2.0	2.0	2.4	2.3
Neurasthenia and the like (part of 84d)	.7	.9	1.0	1.1	1.0
Other diseases of the nervous system (80–85, 87, except part of 84d, and 87b)	1.4	.9	1.3	1.0	1.1
Rheumatism, acute and chronic (58, 59)	3.2	3.6	3.8	4.0	3.9
Diseases of the organs of locomotion, except diseases of the joints (156b)	3.1	2.8	2.9	2.9	2.9
Diseases of the skin (151–153)	2.5	2.5	2.8	2.7	2.9
Infectious [2] and parasitic diseases [2] (1–12, 14–24, 26–29, 31, 32, 34–44)	2.4	1.2	2.5	1.8	2.2
All other diseases (45–57, 60–79, 88, 89, 100, 101, 103, 154, 155, 156a, 157, 162)	8.1	7.1	7.7	7.4	7.0
Ill-defined and unknown causes (200)	3.1	1.9	3.1	2.1	2.4
Average number of males covered in the record	247,626	212,285	241,304	202,910	178,340
Number of organizations	24	26	26	26	----------

[1] Exclusive of disability from the venereal diseases and a few numerically unimportant causes of disability

[2] Except influenza, respiratory tuberculosis, and the venereal diseases.

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

March 1–28, 1942

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the PUBLIC HEALTH REPORTS under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended March 28, 1942, the number reported for the corresponding period in 1941, and the median number for the years 1937–41.

DISEASES ABOVE MEDIAN PREVALENCE

Measles.—The number of cases (86,298) of measles reported for the 4 weeks ended March 28 was only about 55 percent of the number reported during the corresponding period in 1941, but it was about 1.4 times the preceding 4-year average incidence for this period. The Middle Atlantic region alone reported a decline from the seasonal expectancy. In the Pacific region the number of cases (21,911) was almost seven times the 1937–41 average incidence and in the West South Central region the number (13,264) was about four and one-half times the normal seasonal incidence; in other regions the excesses were smaller. During the corresponding period in 1941 measles were unusually prevalent in the Middle Atlantic, East North Central, and South Atlantic regions.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period March 1–28, 1942, the number for the corresponding period in 1941, and the median number of cases reported for the corresponding period, 1937–41

Division	Current period	1941	5-year median	Current period	1941	5-year median	Current period	1941	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	1,175	1,110	1,724	18,831	32,019	33,101	86,298	156,391	62,298
New England	25	9	32	36	159	159	6,153	3,890	4,041
Middle Atlantic	178	180	333	108	584	319	8,552	55,408	13,320
East North Central	187	211	339	533	1,940	1,940	7,891	56,218	5,135
West North Central	80	76	141	231	1,393	1,301	9,483	4,320	4,500
South Atlantic	156	205	283	6,029	11,085	11,834	13,329	19,509	11,873
East South Central	156	74	115	1,742	3,421	3,421	1,898	6,829	1,680
West South Central	255	209	265	7,302	10,377	12,109	13,264	4,502	2,964
Mountain	54	76	76	2,019	1,257	1,185	3,807	2,491	2,725
Pacific	84	70	107	841	1,803	1,539	21,911	3,224	3,224
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	339	195	201	80	69	74	18,079	16,284	21,157
New England	50	12	12	3	1	1	1,810	935	1,406
Middle Atlantic	93	34	44	7	2	7	5,269	4,726	6,947
East North Central	25	25	33	14	5	13	5,420	5,362	7,796
West North Central	8	12	12	9	8	4	2,005	1,450	2,308
South Atlantic	74	43	43	10	15	11	1,184	909	[illegible]
East South Central	22	32	32	9	10	10	794	1,249	648
West South Central	38	18	19	9	10	11	307	429	587
Mountain	3	6	7	6	4	4	552	432	627
Pacific	26	13	13	13	9	9	738	702	1,162
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	95	183	1,290	262	337	423	15,057	17,791	[3] 16,136
New England	0	0	0	8	12	11	1,835	1,465	1,448
Middle Atlantic	0	0	0	47	44	47	3,907	3,230	3,877
East North Central	18	58	199	29	37	47	3,059	3,555	2,991
West North Central	22	77	290	10	14	22	632	1,548	924
South Atlantic	2	2	8	66	68	68	1,626	2,912	2,667
East South Central	11	8	8	28	51	84	506	645	523
West South Central	39	13	98	40	47	93	838	1,434	1,161
Mountain	3	7	78	8	37	19	863	926	859
Pacific	0	18	193	26	27	27	1,731	2,076	1,684

[1] Mississippi, New York, and Pennsylvania excluded, New York City included.
[2] Mississippi excluded
[3] 4-year (1938–41) average

Meningococcus meningitis.—The number of cases of meningococcus meningitis was also relatively high, 339 cases being reported for the current period, as compared with 195 in 1941 and an average of 201 cases for the corresponding period in the 5 preceding years. States contributing largely to the increase were in widely scattered regions. New York reported 59 cases, Massachusetts and Texas 29 each, Virginia 22, Maryland 20, and Rhode Island, Pennsylvania, and California 17 cases each—more than two-thirds of the total cases were reported from those eight States. An increase in this disease is normally expected at this season of the year and in preceding years the peak has usually been reached during the period corresponding to the one under consideration.

Poliomyelitis.—While the incidence of poliomyelitis has been gradually declining toward the low level of this disease which is usually reached during April or May, the number of cases (80) reported for the current period was slightly above the average level of preceding years. Ten cases were reported from California but no more than four cases were reported from any other State.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—For the 4 weeks ended March 28 there were 1,175 cases of diphtheria reported, as compared with 1,110, 1,273, and 1,724 for the corresponding period in 1941, 1940, and 1939, respectively. The number of cases occurring during the current period was slightly above the all-time low incidence recorded for this period in 1941, but it was only about 35 percent of the 1937–41 average incidence for the period. While in some regions the number of cases was larger than in 1941, the East South Central region alone reported an excess over the average seasonal incidence.

Influenza.—For the country as a whole the incidence of influenza was also relatively low, approximately 19,000 cases being reported for the current period, as compared with approximately 32,000, 33,000, and 63,000 cases for the corresponding period in 1941, 1940, and 1939, respectively. The West South Central and South Atlantic regions continued to report the largest numbers of cases, but even there the incidence was comparatively low. Wyoming and Arizona in the Mountain region seemed to be mostly responsible for a slight increase over the normal expectancy in that region.

Scarlet fever.—This disease was more prevalent than it was at this time in 1941, but the number of cases (18,079) was only about 85 percent of the 1937–41 median incidence for the period. A very significant increase over the normal seasonal expectancy was reported from the New England region, with minor excesses in the South Atlantic and East South Central regions. In other regions the

situation was quite favorable, the decreases ranging from about 12 percent in the Mountain region to almost 50 percent in the West South Central region.

Smallpox.—The incidence of smallpox was again comparatively low, 95 cases being reported during the current period as compared with 183 in 1941 and an average of 1,290 cases for the corresponding period in 1937-41. For the country as a whole the number of cases was the lowest on record for this period.

Typhoid and paratyphoid fever.—The number of cases (262) of this disease reported during the current 4-week period was the lowest on record for this period. In the Middle Atlantic, South Atlantic, and Pacific regions the incidence stood at about the expected seasonal level, but in all other regions the numbers of cases were relatively low.

Whooping cough.—Whooping cough was slightly less prevalent than it was during this period in recent years, 15,057 cases as compared with approximately 18,000 cases in 1941 and an average of approximately 16,000 cases in the years 1938–41. The New England region reported an excess of about 25 percent over the seasonal expectancy and the South Atlantic region reported a decline of about 40 percent in the incidence, while in other regions the incidence stood at about the normal seasonal level.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended March 28, based on data received from the Bureau of the Census, was 12.6 per 1,000 inhabitants (annual basis). The rate for the corresponding period in 1941 was 12.7 and the 1939–41 average rate was 12.8. The current rate apparently is about normal for this season of the year.

DEATHS DURING WEEK ENDED APRIL 4, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Apr. 4, 1942	Corresponding week, 1941
Data from 86 large cities of the United States:		
Total deaths	8,430	8,431
Average for 3 prior years	8,732	
Total deaths, first 13 weeks of year	117,314	120,774
Deaths per 1,000 population, first 13 weeks of year, annual rate	12.8	13.2
Deaths under 1 year of age	510	464
Average for 3 prior years	491	
Deaths under 1 year of age, first 13 weeks of year	7,227	6,820
Data from industrial insurance companies:		
Policies in force	64,959,697	64,571,281
Number of death claims	11,809	12,661
Death claims per 1,000 policies in force, annual rate	9.5	10.2
Death claims per 1,000 policies, first 13 weeks of year, annual rate	10.3	11.0

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED APRIL 11, 1942

Summary

Of the nine common communicable diseases listed in the following table and for which weekly figures are available for prior years, the incidence of only two—measles and meningococcus meningitis—is above the 5-year (1937–41) median.

A total of 128 cases of meningococcus meningitis was reported for the current week, which is two to three times the number reported for the corresponding week of any other year since 1937, when 139 cases were reported. The current incidence is above that for last year in each geographic area except the South Atlantic and East South Central. It is four times as high as last year in the West South Central area, and approximately three times as high in the New England and Middle Atlantic States. The largest numbers of cases were reported currently from Texas (23), New York and Pennsylvania (15 each), and Maryland (9).

Smallpox incidence continues low. It is below that for any prior year. Only 13 scattering cases of poliomyelitis were reported for the week. One case of leprosy was reported in New York and 1 case in Illinois, and 2 cases of anthrax were reported in Pennsylvania. Of 26 cases of anthrax reported to date this year, 16 cases have occurred in Pennsylvania; of 944 cases of bacillary dysentery, Texas has reported 567 (also 49 of 212 cases of amebic dysentery); while of 515 cases of unspecified dysentery reported so far this year, Virginia reported 293 and Arizona 185.

Other current reports include 2 cases of Rocky Mountain spotted fever (in the western States) and 27 cases of endemic typhus fever (9 in Texas, 7 in Louisiana, and 5 in Georgia).

The crude death rate for the current week for 88 large cities in the United States is 12.1 per 1,000 population, as compared with 12.0 for the preceding week. The current rate is the same as the 3-year (1939–41) average. For only 3 weeks of the current year has the weekly death rate in this group of large cities been above the 3-year average.

Telegraphic morbidity reports from State health officers for the week ended April 11, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Apr. 11, 1942	Apr. 12, 1941		Apr. 11, 1942	Apr. 12, 1941		Apr. 11, 1942	Apr. 12, 1941		Apr. 11, 1942	Apr. 12, 1941	
NEW ENG.												
Maine	0	0	1	1	2	3	208	56	56	1	1	0
New Hampshire	0	0	0	------	2	------	15	58	58	0	0	0
Vermont	0	0	0	------	------	------	56	18	18	0	0	0
Massachusetts	3	3	3	------	------	------	1,158	921	736	5	2	0
Rhode Island	0	0	0	------	------	------	358	3	30	1	0	0
Connecticut	0	3	3	3	------	5	656	228	228	6	2	2
MID. ATL.												
New York	10	19	19	[1] 10	[1] 18	[1] 18	633	7,601	1,563	15	5	5
New Jersey	4	4	7	11	9	10	907	2,299	1,577	8	2	0
Pennsylvania	10	18	28	------	------	------	1,068	5,316	661	15	6	6
E. NO. CEN.												
Ohio	5	6	12	8	14	14	376	8,945	270	0	1	1
Indiana	6	13	13	45	7	24	134	1,301	137	2	0	0
Illinois	17	13	22	7	30	30	758	3,854	92	6	0	1
Michigan [2]	3	2	10	21	8	8	279	4,745	464	0	0	0
Wisconsin	4	1	1	42	89	89	731	1,622	657	0	1	1
W. NO. CEN.												
Minnesota	2	0	2	2	1	1	937	10	178	0	1	1
Iowa	14	3	3	1	84	9	221	309	231	0	1	0
Missouri	3	3	17	1	2	11	268	274	71	1	0	1
North Dakota	2	1	1	3	7	28	30	7	10	1	0	0
South Dakota	4	0	0	------	------	------	4	2	2	0	0	0
Nebraska	6	0	1	28	------	------	305	17	24	0	0	0
Kansas	3	2	4	13	6	6	532	1,328	513	1	0	1
SO. ATL.												
Delaware	0	0	0	1	------	------	8	282	25	0	0	0
Maryland [2]	2	1	1	14	14	12	792	215	215	9	3	1
Dist. of Col.	1	3	3	3	1	1	134	341	116	0	0	0
Virginia	7	3	13	378	229	229	182	1,862	438	4	2	2
West Virginia	5	6	8	24	9	59	184	678	21	1	2	3
North Carolina	9	6	13	18	54	34	825	1,776	810	2	4	2
South Carolina	6	10	3	402	408	442	200	804	39	3	0	0
Georgia	3	7	7	73	92	94	161	787	194	1	1	1
Florida	1	5	7	11	185	7	283	1,099	160	0	0	0
E. SO. CEN.												
Kentucky	6	4	7	4	4	10	87	1,784	448	3	0	0
Tennessee	5	4	5	48	87	96	129	647	145	1	2	3
Alabama	5	8	9	105	119	142	213	639	169	3	1	4
Mississippi [2]	4	4	4	------	------	------	------	------	------	1	8	1
W. SO. CEN.												
Arkansas	4	8	7	83	168	99	152	390	47	1	0	0
Louisiana	5	5	7	4	20	20	354	167	7	1	0	1
Oklahoma	5	6	6	68	58	115	359	136	112	2	0	1
Texas	37	37	30	726	933	702	2,457	2,197	668	23	2	2
MOUNTAIN												
Montana	3	1	0	8	1	11	76	74	39	0	0	0
Idaho	0	0	1	------	1	5	52	4	15	0	0	0
Wyoming	0	0	1	116	------	------	72	58	46	1	0	0
Colorado	6	12	12	72	19	10	245	375	166	1	1	0
New Mexico	3	1	1	5	6	4	[3] 84	260	81	0	0	0
Arizona	1	4	2	125	101	93	189	53	53	1	0	0
Utah [2]	0	0	0	26	6	6	286	21	102	0	0	0
Nevada	0	0	------	------	------	------	0	0	------	0	0	------
PACIFIC												
Washington	2	1	1	9	3	------	354	110	110	3	0	1
Oregon	0	3	3	16	10	34	156	354	54	0	0	0
California	9	13	21	490	304	186	6,341	340	455	5	1	2
Total	225	243	341	3,034	3,111	3,111	[3] 24,009	54,367	13,447	128	49	49
14 weeks	4,262	4,069	6,907	64,560	466,836	145,658	228,958	430,178	181,278	1,081	711	719

See footnotes at end of table.

***Telegraphic morbidity reports from State health officers for the week ended April 11, 1942, and comparison with corresponding week of 1941 and 5-year median*—Con.**

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Apr. 11, 1942	Apr. 12, 1941		Apr. 11, 1942	Apr. 12, 1941		Apr. 11, 1942	Apr. 12, 1941		Apr. 11, 1942	Apr. 12, 1941	
NEW ENG.												
Maine	0	0	0	8	15	15	0	0	0	1	1	2
New Hampshire	0	0	0	10	5	7	0	0	0	0	1	0
Vermont	0	0	0	13	25	12	0	0	0	0	0	0
Massachusetts	1	0	0	351	206	206	0	0	0	3	0	0
Rhode Island	0	0	0	8	5	12	0	0	0	0	0	0
Connecticut	0	0	0	81	64	97	0	0	0	1	3	1
MID. ATL.												
New York	2	1	2	482	727	808	0	0	0	10	4	5
New Jersey	0	0	0	202	220	174	0	0	0	2	1	3
Pennsylvania	2	0	0	421	420	482	0	0	0	7	6	7
E. NO. CEN.												
Ohio	0	0	0	324	296	296	1	1	3	3	0	4
Indiana	0	0	0	108	137	162	1	0	9	0	0	0
Illinois	0	0	0	233	420	527	0	3	6	0	2	2
Michigan [2]	0	0	0	227	306	413	1	0	9	0	4	3
Wisconsin	0	1	0	142	116	139	0	3	3	1	1	1
W. NO. CEN.												
Minnesota	0	0	0	80	48	51	0	0	5	0	0	0
Iowa	0	1	0	73	53	115	2	3	40	1	1	1
Missouri	0	0	0	56	109	109	1	6	23	1	0	1
North Dakota	0	0	0	23	4	12	0	0	1	4	0	0
South Dakota	0	0	0	38	13	17	0	0	5	0	0	0
Nebraska	0	0	0	31	26	26	0	0	5	0	0	0
Kansas	0	1	0	109	41	78	0	1	2	0	0	1
SO. ATL.												
Delaware	0	0	0	37	19	5	0	0	0	0	0	0
Maryland [2]	0	1	0	82	25	35	0	0	0	2	1	1
Dist. of Col.	0	0	0	12	18	18	0	0	0	0	3	1
Virginia	1	0	0	34	32	33	0	0	0	2	1	3
West Virginia	1	1	1	32	38	49	0	2	0	0	10	2
North Carolina	0	1	0	14	21	28	0	2	0	1	8	2
South Carolina	0	0	0	1	6	6	0	1	0	0	3	2
Georgia	0	0	0	16	15	12	0		0	2	3	3
Florida	1	6	0	7	2	7	0	0	0	11	2	2
E. SO. CEN.												
Kentucky	0	1	0	90	167	72	1	0	1	5	3	3
Tennessee	0	1	1	68	104	58	0	0	0	1	0	3
Alabama	0	0	0	18	11	11	0	0	0	0	1	3
Mississippi [2]	0	0	1	13	10	7	1	0	1	1	1	1
W. SO. CEN.												
Arkansas	0	0	0	5	8	8	5	6	3	0	0	3
Louisiana	0	0	0	8	5	7	2	1	1	3	0	9
Oklahoma	0	0	0	13	10	22	0	0	3	2	0	1
Texas	3	2	0	41	50	60	3	0	5	5	4	9
MOUNTAIN												
Montana	0	0	0	5	41	17	0	0	0	1	0	1
Idaho	0	0	0	19	3	16	0	0	1	0	0	0
Wyoming	0	0	0	12	12	16	0	0	0	0	0	0
Colorado	1	0	0	46	26	34	0	0	3	0	0	0
New Mexico	1	1	0	4	8	15	0	0	0	0	0	1
Arizona	0	0	0	4	7	8	0	0	0	0	0	1
Utah [2]	0	0	0	22	7	18	0	0	0	0	1	0
Nevada	0	0	-----	0	4	-----	0	0	-----	0	0	-----
PACIFIC												
Washington	0	0	0	65	14	37	0	0	4	1	3	0
Oregon	0	0	0	6	13	30	2	2	6	0	2	1
California	0	0	1	76	124	182	0	0	9	3	2	2
Total	13	18	17	3,720	4,062	4,995	20	31	213	77	72	108
14 weeks	312	334	294	55,893	53,109	73,326	321	633	4,333	1,043	1,061	1,514

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended April 11, 1942—Continued

Division and State	Whooping cough, Week ended		Week ended Apr 11 1942								
	Apr 11 1942	Apr 12 1941	Anthrax	Dysentery			Encephalitis	Leprosy	Rocky Mt spotted fever	Tularemia	Typhus fever
				Amebic	Bacillary	Unspecified					
NEW ENG											
Maine	6	43	0	0	0	0	0	0	0	0	0
New Hampshire	7	4	0	0	0	0	0	0	0	0	0
Vermont	40	9	0	0	0	0	0	0	0	0	0
Massachusetts	188	158	0	0	1	0	0	0	0	0	0
Rhode Island	48	21	0	0	0	0	0	0	0	0	0
Connecticut	89	40	0	0	1	0	0	0	0	0	0
MID ATL											
New York	419	283	0	2	2	0	1	1	0	0	1
New Jersey	314	69	0	0	0	0	1	0	0	0	0
Pennsylvania	231	348	2	1	0	0	1	0	0	0	0
E NO CEN											
Ohio	143	426	0	0	0	0	0	0	0	0	0
Indiana	32	25	0	0	0	0	0	0	0	0	0
Illinois	194	76	0	2	0	0	1	1	0	0	0
Michigan [2]	176	330	0	0	1	0	0	0	0	0	0
Wisconsin	132	88	0	0	0	0	0	0	0	1	0
W NO CEN											
Minnesota	45	83	0	0	0	0	0	0	0	0	0
Iowa	11	65	0	0	0	0	0	0	0	0	0
Missouri	13	40	0	0	0	0	0	0	0	0	0
North Dakota	13	25	0	0	0	0	0	0	0	0	0
South Dakota	0	30	0	0	0	0	0	0	0	0	0
Nebraska	7	30	0	0	0	0	0	0	0	0	0
Kansas	34	115	0	0	0	0	1	0	0	2	0
SO ATL											
Delaware	0	4	0	0	0	0	0	0	0	0	0
Maryland [2]	25	64	0	0	0	0	1	0	0	0	0
Dist of Col	14	18	0	0	0	0	0	0	0	0	0
Virginia	48	148	0	1	0	19	0	0	0	1	0
West Virginia	20	46	0	0	0	0	0	0	0	0	0
North Carolina	96	312	0	0	0	0	0	0	0	0	0
South Carolina	55	129	0	0	0	0	0	0	0	0	0
Georgia	28	61	0	1	2	0	0	0	0	1	5
Florida	13	13	0	2	0	0	0	0	0	0	1
E SO CEN											
Kentucky	59	40	0	1	0	0	1	0	0	0	0
Tennessee	41	48	0	0	0	0	1	0	0	2	0
Alabama	20	48	0	0	0	0	0	0	0	1	3
Mississippi [2]			0	0	0	0	0	0	0	1	0
Arkansas	8	12	0	1	0	0	0	0	0	0	1
Louisiana	11	9	0	0	10	0	0	0	0	1	7
Oklahoma	8	25	0	0	0	0	0	0	0	0	0
Texas	188	337	0	4	20	0	0	0	0	1	9
MOUNTAIN											
Montana	11	24	0	1	0	0	0	0	1	0	0
Idaho	0	17	0	0	0	0	0	0	0	0	0
Wyoming	8	0	0	0	0	0	0	0	0	0	0
Colorado	47	108	0	0	0	0	0	0	0	0	0
New Mexico	45	29	0	0	0	0	0	0	0	0	0
Arizona	46	21	0	0	0	25	1	0	0	0	0
Utah [2]	32	69	0	0	0	0	0	0	0	0	0
Nevada	12	4	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	96	63	0	0	0	0	0	0	0	0	0
Oregon	34	19	0	0	0	0	0	0	1	0	0
California	286	445	0	0	0	0	2	0	0	0	0
Total	3 393	4 419	2	16	37	44	11	2	2	11	27
14 weeks	54 101	61 840									

[1] New York City only
[2] Period ended earlier than Saturday
[3] Correction Week ended Mar 28 1942 Measles New Mexico 130 cases

WEEKLY REPORTS FROM CITIES

City reports for week ended March 28, 1942

This table lists the reports from 90 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	11	2	2	1	8	0	0	0	0	1
Baltimore, Md	0	0	4	0	441	6	23	0	35	0	0	32
Barre, Vt	0	0		0	0	0	0	0	0	0	0	2
Billings, Mont	0	0		0	0	0	1	0	1	0	0	0
Birmingham, Ala	1	0	8	2	7	0	6	0	4	0	0	14
Boise, Idaho	0	0		0	0	0	0	0	0	0	0	0
Boston, Mass	0	0		0	170	4	15	0	87	0	1	62
Bridgeport, Conn	0	0		0	14	1	3	0	3	0	0	3
Brunswick, Ga	0	0		0	10	0	0	0	0	0	0	0
Buffalo, N Y	0	0		0	19	1	10	0	15	0	0	3
Camden, N J	1	0		0	10	0	1	0	12	0	0	2
Charleston, S C	0	0	12	1	2	0	0	0	0	0	0	7
Charleston, W Va	0	0	3	0	0	0	0	0	0	0	0	5
Chicago, Ill	10	0	7	1	108	0	32	0	89	0	0	100
Cincinnati, Ohio	0	0	2	4	3	1	7	0	21	0	0	12
Cleveland, Ohio	2	0	4	0	4	0	13	1	37	0	0	17
Columbus, Ohio	0	0	3	3	11	0	3	0	5	0	0	0
Concord, N H	0	0		0	0	0	0	0	1	0	0	0
Cumberland, Md	0	0		0	1	0	0	0	1	0	0	0
Dallas, Tex	1	0		0	286	0	1	0	4	0	0	5
Denver, Colo	4	0	21	0	115	0	2	0	1	0	0	14
Detroit, Mich	2	0	1	1	60	0	24	0	129	0	0	65
Duluth, Minn	0	0		0	2	0	1	0	9	0	0	6
Fall River, Mass	1	0		0	20	0	2		51	0	0	0
Fargo, N Dak	0	0		0	1	0	0	0	2	0	0	3
Flint, Mich	0	0		0	6	0	4	0	13	0	0	0
Fort Wayne, Ind	0	0		0	1	0	1	0	2	0	0	1
Frederick, Md	0	0		0	20	0	1	0	0	0	0	1
Galveston, Tex	0	0		0	1	0	1	0	1	0	0	0
Grand Rapids, Mich	1	0		0	5	0	2	0	6	0	0	2
Great Falls, Mont	0	0		0	19	0	0	0	0	0	0	2
Hartford, Conn	0	0		0	40	0	0	0	0	0	0	2
Helena, Mont	0	0		0	2	0	0	0	0	0	0	0
Houston, Tex	1	0		0	51	0	11	0	1	0	1	1
Indianapolis, Ind	4	0		1	49	0	14	0	23	0	0	21
Kansas City, Mo	1	0		2	65	0	5	0	44	0	0	4
Kenosha, Wis	0	0		0	7	0	0	0	2	0	0	10
Little Rock, Ark	0	0	8	0	47	0	4	0	0	0	0	0
Los Angeles, Calif	3	0	22	0	643	1	20	0	23	0	0	29
Lynchburg, Va	0	0		0	2	0	2	0	2	0	0	8
Memphis, Tenn	0	0		3	15	0	6	0	4	1	1	6
Milwaukee, Wis	0	0	1	1	127	0	12	0	34	0	0	46
Minneapolis, Minn	3	0		1	255	0	6	0	15	0	0	9
Missoula, Mont	0	0		0	0	0	1	0	4	0	0	0
Mobile, Ala	0	0	3	1	4	0	2	0	2	0	0	0
Nashville, Tenn	0	0		1	0	0	6	0	2	0	0	7
Newark, N J	0	0	9	0	134	1	5	1	29	0	0	40
New Haven, Conn	0	0		0	215	0	2	0	1	0	0	1
New Orleans, La	2	0		0	64	1	6	0	2	0	2	0
New York, N Y	30	0	11	2	53	16	86	2	337	0	2	240
Omaha, Nebr	1	0		0	137	0	3	0	4	0	0	0
Philadelphia, Pa	1	0	4	3	29	3	36	0	333	0	0	53
Pittsburgh, Pa	3	0		1	19	2	15	0	11	0	0	8
Portland, Maine	0	0		0	4	1	6	0	5	0	0	0
Providence, R I	1	0		0	179	1	3	0	12	0	0	41

City reports for week ended March 28, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Pueblo Colo	0	0		0	12	0	0	0	5	0	0	0
Racine Wis	0	0		0	13	0	0	0	1	0	0	13
Raleigh N C	0	0		0	6	1	6	0	0	0	0	6
Reading Pa	0	0		1	1	0	3	0	0	0	0	6
Richmond Va	0	0	7	1	2	0	3	0	3	0	0	1
Roanoke Va	0	0		0	0	0	0	0	0	0	0	0
Rochester N Y	0	0		0	16	0	4	0	6	0	0	4
Sacramento Calif	1	0		0	97	0	4	0	0	0	0	23
Saint Joseph Mo	1	0		0	6	0	2	0	3	0	0	0
Saint Louis Mo	0	0	1	1	253	0	10	0	29	0	0	6
Saint Paul Minn	0	0		0	360	0	4	0	7	0	0	12
Salt Lake City Utah	0	0		0	17	0	3	0	3	0	0	7
San Antonio Tex	0	0	6	2	27	0	9	0	3	0	0	0
San Francisco Calif	2	1	3	0	306	3	9	0	15	0	1	18
Savannah Ga	0	0	8	1	12	0	1	0	0	0	0	0
Seattle Wash	0	0		2	13	1	3	0	2	0	0	18
Shreveport La	1	0		0	10	0	2	0	0	0	0	0
South Bend Ind	0	0		0	1	0	0	0	24	0	0	2
Spokane Wash	0	0		0	6	0	6	0	3	0	0	6
Springfield Ill	0	1		0	311	0	4	0	5	0	0	0
Springfield Mass	0	0		0	44	2	1	0	15	0	0	10
Superior Wis	0	0		0	1	0	0	0	2	0	0	2
Syracuse N Y	0	0		0	41	0	4	0	3	0	0	33
Tacoma Wash	0	0		1	0	0	3	0	1	0	0	2
Tampa Fla	0	0		0	10	0	2	0	0	0	5	0
Terre Haute Ind	0	0		0	0	0	2	0	0	0	0	0
Topeka Kans	0	0		0	6	0	0	0	1	0	0	3
Trenton N J	0	0	1	0	2	0	3	0	10	0	0	6
Washington D C	0	0	4	4	88	2	20	0	13	0	0	19
Wheeling W Va	0	0		0	15	0	0	0	1	0	0	0
Wichita Kans	0	0	3	2	32	1	5	0	8	0	0	5
Wilmington Del	0	0		0	4	0	4	0	3	0	0	3
Wilmington N C	0	0		0	51	0	3	0	0	0	0	0
Winston Salem N C	0	0		0	37	0	2	0	3	0	0	0
Worcester Mass	0	0		0	12	0	10	0	14	0	0	49

Anthrax—Cases Philadelphia 1
Dysentery amebic—Cases Chicago 1 Los Angeles 1 New York 5 St Louis 1
Dysentery bacillary—Cases Los Angeles 2 New York 4
Typhus fever Cases Charleston S C 1 New Orleans 8 New York, 1 Savannah, 1

Rates (annual basis) per 100 000 population for a group of 90 selected cities (population, 1942, 34 091,818)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
Week ended Mar 28 1942	11 93	25 54	6 88	809 25	83 20	252 67	0 15	1 99	174 06
Average for week 1937 41	15 90	67 00	12 66	1327 56	104 83	291 48	3 24	2 93	183 41

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended March 14, 1942.—During the week ended March 14, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		3	3	10	11	1			5	33
Chickenpox	1	29		189	372	52	35	21	125	824
Diphtheria	2	19		19	1	4		2	7	54
Dysentery				3					1	4
German measles		5	1	27	65	8	12	20	35	173
Influenza		44			14				48	106
Measles		5	3	663	239	236	18	8	20	1 192
Mumps		17	7	467	478	171	215	109	603	2 06
Pneumonia	1	16			11	4			11	43
Poliomyelitis			1			1				2
Scarlet fever	4	21	18	110	342	50	33	92	27	697
Tuberculosis		16	8	174	50		4	2		254
Typhoid and paratyphoid fever			1	7	1					9
Undulant fever					1					1
Whooping cough	4	20	1	144	67	9	15	2	47	309
Other communicable diseases	1	15		2	218	43	6		8	293

FINLAND

Communicable diseases—December 1941.—During the month of December 1941, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	167	Poliomyelitis	2
Influenza	1, 572	Scarlet fever	218
Paratyphoid fever	83	Typhoid fever	71

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-named diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

Plague

Argentina—Cordoba Province.—Plague has been reported in Cordoba Province, Argentina, as follows: January 1–31, 1942, 2 cases, 1 death; February 1–28, 5 cases, 4 deaths.

Indochina (French)—Laos.—During the period March 11–20, 1942, 13 cases of plague were reported in Laos, French Indochina.

Morocco.—During the week ended March 21, 1942, 41 cases of plague were reported in Morocco. For the week ended March 14, 1942, 11 cases were reported.

Typhus Fever

Morocco.—During the week ended March 21, 1942, 1,280 cases of typhus fever were reported in Morocco.

Rumania.—During the week ended March 28, 1942, 200 cases of typhus fever were reported in Rumania. During the preceding week 171 cases were reported.

Spain.—For the week ended March 7, 1942, 230 cases of typhus fever were reported in Spain (69 cases in Madrid, and 75 cases in Barcelona).

Tunisia.—Typhus fever has been reported in Tunisia as follows: Week ended February 28, 1942, 663 cases (75 cases in Tunis and 16 in Sfax); week ended March 7, 874 cases (83 in Tunis); week ended March 14, 582 cases (59 in Tunis); week ended March 21, 811 cases (75 in Tunis).

Yellow Fever

Sierra Leone—Freetown (vicinity of).—On February 9, 1942, 1 case of yellow fever with 1 death was reported in the vicinity of Freetown, Sierra Leone.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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Public Health Reports

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CADMIUM POISONING

Prepared by the DIVISION OF INDUSTRIAL HYGIENE, *National Institute of Health, United States Public Health Service*

CONTENTS

Occurrences and Uses

There has been a pronounced increase in the use of cadmium in industry following its introduction into electroplating materials and alloys (*67*). It is of interest that parallel with this increase in the industrial use of cadmium there has been an increased amount of cadmium poisoning. Cadmium occurs in small quantities in zinc ores (1 to 3 percent) and as the mineral greenockite (cadmium sulfide). It is used little as a metal directly. Its greatest importance is as a constituent of alloys and in the form of its compounds. These are used in electrical conductors, jewelry, plating, pigment, ceramics, cadmium vapor lamps, process engraving, photography, and alkaline storage batteries (*67*, *83*).

Cadmium is used as a substitute for tin in antifriction metals and in solders, its principal use being in bearing metals for automobiles. Its presence in small amounts in copper wire adds strength with but small reduction in the conductivity. Cadmium plating is used to rustproof wires, tools, and other iron and steel articles (*51*).

While there has been on over-all increase in the use of cadmium for plating, there has recently been a tendency in industry to restrict its use somewhat. This is due not only to the high cost of cadmium, but also to a questioning of its efficacy as a protective coating. According to Burns and Schuh (*8*), "Its efficacy as a protective coating is inferior to that of zinc and interest in cadmium as a coating material has waned of late."

Physico-Chemical Properties of Cadmium

Cadmium is ductile, malleable, and capable of taking a high polish. These properties and the fact that it is resistant to corrosion and rust have caused this unusual increase in its use, particularly in the manufacture of marine hardware and in the automobile industry (*67*).

Cadmium, Cd, has an atomic weight of 112.41 and a density of 8.6 gm. per cc. at 20° C. It is a silvery-white metal with a slight bluish tinge. It is not as hard as zinc, and at ordinary temperatures is much more ductile and malleable. Like zinc, however, it becomes very brittle at higher temperatures, the change likewise appearing to be due to a crystalline transition. The electrical conductivity of cadmium is somewhat less than that of zinc. It melts at 320.9° C. and boils at 767° C. The solubility of $Cd(OH)_2$ in water is 2.6×10^{-4} gm. per liter. When heated in air, cadmium volatilizes and burns with a bright flame emitting an abundance of brown oxide (CdO) fume (*51*).

Determination of Cadmium

The analytical separation and means of identification of cadmium of greatest interest in industrial hygiene relate to the evaluation of the cadmium content of dust, or fumes, or to its presence in animal tissues or fluids. One is usually concerned with traces of the metal only, and the problem of separation and determination of these small amounts differs from that usually employed for the analytical evaluation of cadmium in ores, alloys, etc.

With reference to cadmium in animal tissues and biological fluids Fairhall and Prodan (*21*) developed a colorimetric method for the determination of minute amounts of cadmium in which advantage is taken of the intensification of color of the sulfide under ultraviolet rays. A sensitivity of 1:2,500,000 is obtained by this method and an accuracy of 4 percent in the analysis of material containing from 0.40 to 1.00 mg. of cadmium in 100 gm. of organic material. This method may be conveniently adapted to the analysis of cadmium dust and fume in air samples.

A number of organic reagents develop colors with cadmium and are useful also for the colorimetric determination, provided interfering metals are removed. Among these are diphenylcarbazide (*22*), diphenylthiocarbazone (dithizone) (*23*), hydroxyquinoline (*106*),

p-nitrobenzene-diazoaminoazabenzene (cadion) (*17*), and quinaldinic acid (*77*).

For the estimation of the cadmium content of air containing cadmium dust, samples may be obtained by drawing measured volumes through an impinger apparatus, and for the collection of fume an electrostatic precipitator may be used. The details of ashing, separation, and quantitative estimation of cadmium are given in the various references cited above.

Industrial Exposure to Cadmium

Industrial poisonings usually occur from the absorption of vapor, fumes, or dust, through the respiratory system. According to Public Health Bulletin No. 259 (*3*), the estimated number of workers in the United States potentially exposed to cadmium is 30,927.

While the expected number of workers exposed to cadmium poisoning in the United States amounts to 30,927, the known exposure to cadmium poisoning in 15 States listed according to industry is shown in table 1.

TABLE 1.—*Industrial exposure to cadmium*

Industry	Number of workers exposed	Industry	Number of workers exposed
Chemical and allied	191	Paper and printing	19
Clay, glass, and stone	47	Miscellaneous and manufacturing industries	364
Iron and steel	381		
Metal industries, except iron and steel	2,024		
Lumber and furniture	5	Total	3,031

Among the industrial processes in which cadmium poisoning may occur are the smelting of cadmium ores, working up of residues, welding of alloys, spraying of cadmium bearing paints and pigments, manufacture of cadmium compounds, melting the metal, and cadmium processes particularly of marine hardware and other fittings which were formerly zinc coated (*74*).

The following occupations have been listed as offering exposure to cadmium (*15*, *67*): cadmium-alloy makers, cadmium and cadmium compound makers, cadmium platers, cadmium-vapor-lamp makers, calico printers, chargers (zinc smelting), color makers, electroplaters, glass colorers, lithopone makers, solderers, solder makers, storage-battery makers, welders and zinc smelters and refiners, chemical process men, glassblowers, cupola tenders, painters, polishers, grinders, and buffers.

In the reduction of cadmium ore there is a potential exposure to arsine. The fire hazard in connection with the blue powder formed in reduction of cadmium ore and that of cadmium sulfide should also be noted (*74*). Cyanogen may be given off from the open tanks in plating (*37*).

All the known cases of cadmium poisoning which have been reported up to the present time are summarized in table 2.

TABLE 2.—*Cases of cadmium poisoning reported to date*

Date	Name	Number of cases	Type of poisoning: Ingestion	Inhalation	Injection	Death	References
1858	Sovet	3		3			Presse med. belge, 10 69 (1858).
1866	Hinder (W. J. Palmer)	1	1			1	Indian M. Gaz., 1 156 (1866).
1876	Wheeler	2	2				Bost. Med. and Surg. J., 95: 434 (1876).
1920	Stephens	9		9		1	J. Ind. Hyg., 2 129 (1920).
1921	Teleky and Brezina	1		1			Schrift. a. d. Gesamtgeb. d. Gewerbehyg, No. 9, p. 76, Julius Springer, Berlin, 1921.
1923	Legge	3		3		1	Ann. Rep. Chief Inspect. Factories for 1923. H. M. Stationery Office, p. 74, 1924
1928		(1)	(1)				Food, Drug and Insect. Rev., 12: 26 (1928).
1929	Dubperriell	(2)	(2)				Metal Ind., 27· 372 (1929).
1930	Schwarz	1		1			Ztschr. f. Gewerbehyg., 36 190 (1930).
1931	Bridge	2		2			Legge, T. M., Industrial Maladies, London, p. 102, 1934.
1931	Griebel and Weiss	11	11				Pharm. Zentralhalle, 72 689-90 (1931).
1932	Wahle	1		1			Zentralbl. f. Gewerbehyg., 9: 223-26 (1932).
1934	Führer and Blume	2		2			Arch Gewerbepath. u. Gewerbehyg., 5. 117-84 (1934)
1934	Hazen	3	3				Food Ind., 6 628 (1934).
1935	Larson	2	2				Münch. tierärztl. Wschr., 86 509-11 (1935).
1936	Fairhall	2		2		1	J. Ind. Hyg, 18 669-80 (1936).
1936	Gayvoronski, Demidow, and Heller.	8		8			Sovet, vrach zhur., pp. 1568-1570, 1936.
1937	Gasmaske	1		1		1	Gasmaske, 9· 37-38 (1937).
1937	Pancheri	1		1		1	Securitas, 24· 61 (1937).
1938	Bulmer, Rothwell, and Frankish.	15		15		2	Canad. Pub. Health J., 29: 19-26 (1938).
1939	Richnow	1		1			Samml. Vergift., 10: (A), 77-80 (1939).
1939	Ohio Ind	2		2			Ohio Ind. Hyg. Bull. Vol. 1, No. 2, 1939.
1939-1940	Kamakura	1			1	1	Jap. J. Med. Sc., Soc. Med. and Hyg. 3, Proc. 206 (1939-1940).
1940	Mancioli	3		3			Rass. Med. App. Lav. Ind., 11. 632-39 (1940).
1940	Pancheri	1		1			Rass. Med. App. Lav. Ind., 11: 623-631 (1940).
1941	Conn. Health Bull	1		1			Conn. Health Bull., 55· 29 (1941).
1941	Cangelosi	218	218				U. S. Nav. Med. Bull., 39. 808-10 (1941).
1941	Frant and Kleeman	50	50				J. Am. Med. Assoc., 117 86-9 (1941).
1941	Nasatir	1		1	1	1	Month. Pub. Div. of Ind. Hyg., Nat. Inst. of Health, Vol. 1, No. 6 (May 1941).
	Total	346	287	58	1	10	

[1] Unknown. [2] Several (?).

Toxicology

INDUSTRIAL CADMIUM POISONING

As early as 1656, Stockhusen (*96*) described what is perhaps the first data on industrial cadmium poisoning in his book on lead colic and arsenic fumes. According to Stockhusen, cadmium fumes cause gastrointestinal disturbances in foundry workers, these disturbances being accompanied by diarrhea and vomiting, in contrast to lead fumes which cause constipation. Later Tracinski (*98*) and

Seiffert (*88*) called attention to the dangers which menace workers from cadmium fumes developing in zinc workers engaged in ore distillation processes. These symptoms were similar to zinc ague and consisted of digestive and metabolic disturbances. In spite of the comparatively few known cases of industrial poisoning due to cadmium, this metal has long been considered dangerous from an industrial hygiene standpoint.

Investigations of poisoning caused by exposure to cadmium have been made and reported by Chajes (*11*), Fisher (*24*), Lewin (*56*), Gadamer (*32*), Kobert (*47*), Schwarz and Otto (*86*), Starkenstein, Rost, and Pohl (*94*), Otto (*68*), and Leschke (*54*).

EXPERIMENTAL CADMIUM POISONING

In 1867, Marmé (*61*) published the first experimental work of importance on the toxic effect of cadmium. Following Marmé's investigations, animal experimentation was carried out by De Simone (*92*), Athanasiu and Langlois (*2*), Paderi (*70*), Severi (*89*), Schwartze and Alsberg (*87*), Johns, Finks, and Alsberg (*44*), Hanzlik and Presho (*38*), Schwarz and Otto (*86*), Otto (*68, 69*), Husemann (*42*), Kochmann and Grouven (*48*), Formenti (*26*), Prodan (*75*), Pühler (*76*), Wilson, De Eds, and Cox (*108, 109*), Capelli (*10*), Briganti (*5*), Kamakura (*46*), Gitzhugh and Meiller (*35*), while Ciriminna (*12*) studied the formation of lipoid cadmium compounds in the organism and Menna (*62*), Lewin (*56*), and Kunkel (*49*) have discussed cadmium poisoning at some length with respect to industrial poisoning.

Acute cadmium poisoning by ingestion.—According to Kobert (*47*) the fatal dose for dogs by mouth amounts to 0.15–0.30 gm. per kg. of body weight. Lewin (*56*) states that dogs die after an intravenous injection of 0.03 gm. or after 0.3–0.6 gm. *per os*. Kunkel (*49*) noted that dogs die after an intravenous injection of 0.03 gm., cats after 0.015 gm , and rabbits after 0.01–0.02 gm., and that the fatal dose for the rabbit (weight 1.5–1.8 kg.) *per os* amounted to 0.3–0.5 gm.

Blume (*4*) states that the minimum lethal dose of cadmium for man is not known. However, according to Lewin (*56*), 0.03 gm. of cadmium sulfate by mouth causes increased salivation, choking attacks, persistent vomiting, abdominal pain, diarrhea, and tenesmus. These are the symptoms, according to most investigators, which occur most frequently in cases of poisoning due to cadmium. Sigel (*90*), however, reported that respiration is retarded, and attacks of vertigo and loss of consciousness also occur. According to Athanasiu and Langlois (*2*) cadmium paralyzes the central nervous system.

Van Hasselt (*100*) cites the case of Burdach (*7*) who produced nausea and vomiting in himself with one-half grain (33 mg.) of cadmium sulfate. Griebel and Weiss (*36*) noted that even 10 times the amount

given by Burdach, when administered *per os*, was tolerated without permanent injury.

Hinder (W. J. Palmer) (*41*) in 1866 reported the death of a 14-year-old boy in India who was given cadmium chloride in place of epsom salts as a purgative. The total amount administered was approximately 8.9 gm. Death occurred within about one hour and a half after taking the cadmium chloride.

ACUTE CADMIUM POISONING IN MAN BY INHALATION

The great increase in the use of cadmium not only for coating marine hardware but also for many fittings that were formerly zinc coated has presented a new problem in industrial hygiene (*20*). Heretofore, exposure to cadmium had been very slight and was confined to the relatively small amount of metal reduced annually and to the small amount of cadmium yellow manufactured. The various cases of cadmium poisoning in man which have resulted from the inhalation of cadmium dust or fume to date are indicated in table 2.

Symptoms of cadmium poisoning following inhalation.—The first symptoms of industrial cadmium poisoning are usually dryness of the throat, cough, headache, vomiting, and a sense of constriction of the chest. Later symptoms are predominantly referable to the respiratory system and are characterized by cough, pain in the chest, severe dyspnea, and prostration. These symptoms result from a pneumonitis which in many instances is followed by bronchopneumonia. A few cases have complaints referable to the gastrointestinal tract.

There is a similarity in the symptomatology of cadmium poisoning from its fumes and dust and poisoning with other industrial fumes such as nitrous fumes and methyl bromide. All these cause severe lung damage which usually manifests itself hours after exposure, and these substances can be breathed in fatal concentrations without enough discomfort to drive the worker away from the exposure.

Pathology of acute cadmium poisoning in man.—The pathological changes associated with cadmium poisoning reported in the literature are referable in man only to acute poisoning and may be summarized as follows:

Two fatal cases of cadmium poisoning reported by Bulmer, Rothwell, and Frankish (*6*) revealed on post-mortem examination edema, congestion, hemorrhage, and partial collapse of the lungs. Cloudy swelling of cells of the liver and kidney was noted. In one case, there was also congestion of spleen, fatty infiltration of pancreas, and slight chronic gastritis.

Legge (*52*) in the fatal case reported by him found congestion of the larynx, trachea, and bronchi, and congestion of the stomach and intestine; the heart and liver showed fatty metamorphosis, and acute inflammatory changes were found in the kidneys.

Essor (*19*) quoting Petri (*73*) states that in acute poisoning with soluble salts, congestion and pulmonary infarcts, subdural hemorrhages, catarrhal and ulcerative gastroenteritis are seen. The kidneys show degenerative changes sometimes leading to necrosis and followed by repair.

Kamakura (*46*) reports the case of a young man, 18 years of age, who received an intravenous injection of 10 cc. of a 2-percent cadmium chloride solution mistaken for calcium bromide. On autopsy, gross findings were cyanosis and marked edema of the face. Hemorrhages in the viscera, particularly the heart and lungs, edema of the pharynx and larynx, and a decreased blood viscosity were also observed.

The hematological changes associated with cadmium poisoning have been investigated by Athanasiu and Langlois (*2*), Otto (*68*), Moog and Pelling (*63*), Kobert (*47*), Kochmann and Grouven (*48*), Briganti (*5*), Prodan (*75*), Gitzhugh and Meiller (*35*), Blume (*4*), Waterman (*105*), Simon (*91*), and Pancheri (*72*). Very little work has been reported, however, with reference to blood changes in man following cadmium poisoning.

Therapeutic Uses of Cadmium

Cadmium salts have been advocated for the treatment of syphilis (*29, 48, 55, 57*), malaria (*79*), pulmonary tuberculosis (*14, 40, 58, 59, 80, 82, 99, 101, 103, 104*), and dementia praecox (*78*). However, the therapeutic use of cadmium is not particularly germane to this discussion of the toxicity of cadmium, and therefore further reference to its use has been omitted.

Acute Cadmium Poisoning in Man by Ingestion

Cadmium may occur in food products that have been produced or processed in cadmium-plated vessels or molds. It is considered poisonous in small amounts (*43*).

Cadmium is also of importance from the public health standpoint because of its solubility in acids. The metallic cadmium coating on utensils used for food dissolves when in contact with solutions containing as little as 0.5 to 2.5 percent of acetic acid. Cadmium is also soluble in other organic acids commonly found in foods, such as citric, tartaric, malic, and lactic acids, even though the concentrations of these may be small. With all these, organic cadmium salts are formed. It has been stated that these salts, when taken internally, combine with the hydrochloric acid of the gastric juice to produce poisonous cadmium chloride (*28*).

Cadmium is readily detected in food and vomitus. The wet-ashed solution should be neutralized and made slightly acid, and then hydrogen sulfide should be passed in. Yellow cadmium sulfide is pre-

cipitated (*28*, *43*). Small amounts can be determined by the colorimetric-sulfide method referred to above (*21*).

Comparatively few cases of poisoning by ingestion of cadmium and its compounds were reported in the older literature. Table 2 summarizes the cases of cadmium poisoning by ingestion that have been reported to date.

It is important that the plating industry, in its search for substitutes for tin and other valuable war materials, be cautioned that cadmium is not a suitable substitute in the plating of utensils for food. New York City has already taken these steps. Representatives of the plating industry were called into conference and advised to discontinue the use of cadmium in utensils and dispensers for food. As a result the sanitary code of the City of New York, which deals with all measures concerning the health of the citizens of New York, was amended to prohibit the use of cadmium in articles used in the preparation of food and drink (*28*, *65*, *84*).

Prior to 1941 a total of 20 cases of cadmium poisoning, due to the ingestion of cadmium, have been reported in the literature. Since January 1941, 315 cases have been definitely caused by cadmium poisoning.

Owing to the greatly increased technical use of cadmium in the manufacture or repair of various types of containers and the increasing use of cadmium for plating, the possibility of such containers being used for food purposes is apparent. Several instances have occurred where food utensils which have been repaired and unsuspectingly plated with cadmium have later caused acute illness.

It is also possible that cases of cadmium poisoning have been mistaken for food poisoning owing to the similarity of the symptomatology of cadmium poisoning to ordinary so-called "food poisoning."

For these reasons it is advisable to warn the public against the use of cadmium-plated utensils for food purposes and especially to caution against having utensils cadmium plated where repairs are necessary.

Maximal Permissible Concentration of Cadmium

No extensive study of the permissible concentration of cadmium has been made with respect to exposure of human beings. As far as animal experimentation is concerned, the concentration necessary to produce direct toxic action has usually been far in excess of what would be permitted in industry except in case of an accident. However, in view of the fatalities which have arisen from a number of cases of exposure in industry, the maximum allowable concentration of cadmium or of its compounds in air has been accepted as 1 milligram of cadmium per 10 cubic meters of air [1] (*18*).

[1] This figure for the maximal permissible concentration of cadmium has been accepted and published by the American Standards Association in its American Allowable Concentrations of Cadmium. Copies of the standard may be obtained from the American Standards Association, 29 West Thirty-ninth Street, New York, N. Y.

Measures for the Prevention of Industrial Cadmium Poisoning

Prevention of industrial cadmium exposure depends upon the type of process involved in which cadmium fumes are generated. Where cadmium plating is done, prevention may be obtained by the use of specially designed exhaust ventilation systems, which are similar to those used in clearing the air of chromium vapors in the process of chrome plating. For some processes, a positive pressure mask is necessary for protection of exposed workmen. An approved type of respirator is recommended where the concentration of cadmium is low; a soda lime cartridge may be attached to the respirator when acid fume is also present in the atmosphere. The positive pressure mask should be used in all cases where the cadmium content is high (*75*).

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AN EPIDEMIC OF BOILS IN A GROUP OF TUNNEL WORKERS[1]

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Since February 1941 there has been an epidemic of boils among the workers of the Carlton Tunnel, Cripple Creek, Colo. This tunnel has

[1] From the Dermatoses Investigations Section, Division of Industrial Hygiene, National Institute of Health.

been of unusual interest to the engineering profession, as it was here that the world's record for hard rock tunneling was achieved.

The Colorado State Board of Health, lacking an industrial dermatologist, asked the United States Public Health Service to make a study of the outbreak.

It was found upon investigation that the boils began to appear shortly after underground water was encountered in February 1941. A force of 85 men, divided into three shifts, was employed on the job. Approximately four hundred men have been employed in the past year. The large turn-over was due in part to the fact that over 50 percent of the men were discharged because they were unable to produce the required amount of work. But a considerable number of workers left because of health complaints, the majority complaining of recurring furunculosis. A small percentage became afraid of tunnel work and gave up their jobs.

From February 26 to June 20, 1941, a period of about 5 months, 22 workmen were forced to give up work because of boils; taking into account the labor turn-over, this amounts to about 40 percent of the workers per year who are being forced to give up their jobs. Even this does not give a complete picture of the frequency of occurrence of boils because many of the workmen with boils did not leave the job and are either now free of lesions or still have an occasional boil. At the time the investigation was made, ten men were found working who were suffering from boils; one man, with dermatitis of both feet, was not working because of his skin condition.

The majority of the lesions were on the wrist and neck. They were, as a rule, deep-seated nodules with a fluctuant central mass and an area of erythema in the adjacent skin. Many of the lesions had broken down, or had been incised by the company physician, and were exuding thick, yellow pus. Several of the lesions were typical carbuncles with numerous openings discharging purulent material.

The tunneling consists of blasting the hard rock through which the bore is being driven, and the removal of the rock debris. Although there are 14 different jobs involved in tunneling, the large majority of boils have occurred among the seven classes of workers named below, in the order of frequency of occurrence. These seven jobs entail the greatest contact with water, rock dust, perspiration, and friction from working clothes:

Drillers	Operate the drilling machines.
Nippers	Assist the drillers and help load the drill holes with the blasting charge.
Muckers	Operate the mucking machine, which removes the rock debris from the tunnel floor and deposits it in the mine cars.
Chuck tenders	Carry supplies from the train to the working face and assist where needed.

Motormen	Run the storage battery electric mine trains, shift cars, and dump the rock debris at the portal of the tunnel.
Trackmen	Repair and extend the railroad track and road bed.
Foreman or shifter	Assists and directs the drilling, blasting, and mucking of his work gang.

The detailed work is directed by the tunnel engineers and the tunnel superintendent.

A typical work day may be summarized as follows: The workmen change to their work clothes, rubber boots, raincoats, and safety hats, which are equipped with electric battery lights. They then travel through the tunnel on an electric man-car to the working face. Arriving near the face, the men leave the car and wade through water, which is knee-deep, to their place of work and start their specific jobs. At the end of 8 hours at the face, they are brought to the portal of the tunnel on the man-car. At the "change house" they remove their wet working clothes and change to street clothes.

At the time of the study, the tunnel was 6 miles long and the time of transit was three quarters of an hour each way. During the journey through the tunnel the men were exposed to ceiling water, rock dust, and also to the gases resulting from the detonation of the blasting powder, which was concentrated in pockets to such an extent that a respirator was used about three times during a trip in or out of the tunnel.

While working at the face, the workmen are exposed to rock dust resulting from drilling and also powder fumes, smoke, the oxides of nitrogen, and carbon monoxide. Since the temperature is about 76° F. (wet and dry bulb), and the ventilation only fair, the men perspire profusely while they work.

The floor water is 2½ to 3 feet deep and flows from the portal at an estimated rate of 20,000 gallons per minute. The water is contaminated, because of lack of toilet facilities in the tunnel. The men urinate and defecate in the tunnel water, there being no privy or receptacle for body discharges. A portion of this tunnel water is piped to the air condenser machines through which it is circulated to cool them. The water thus heated is used for bathing purposes.

The men change clothing in the "change house," hanging their wet clothes on a wooden cross piece which is pulled to the ceiling by means of a rope and pulley. Here the clothes dry without having been washed and remain until the next day. Each workman owns his own clothes. The work clothes are rarely washed and, as a rule, are worn until they are so torn that they are no longer serviceable.

At the time of the survey, there was an adequate number of shower baths in the change house but these were rarely used because there was no means of furnishing uncontaminated cold water, and the heated water was too hot to use on the skin. Consequently, most of

the men did not use the showers, but wore their street clothes over their uncleansed bodies to their homes.

It was first thought that the contaminated tunnel water or the chemicals it contained were the chief factors in causing the outbreak of boils. But the insanitary conditions, plus the macerating action on the skin of the warm tunnel water and the perspiration, plus the abrasive action of the tunnel dust, clothes, and rubber coats, are sufficient to account for the presence of boils, even without considering bacterial or chemical content of the tunnel water. These facts are substantiated by the literature (*1*).

Nevertheless, bacteriological examination and patch tests were made with the underground water and rock dust to determine the possible presence of pathogenic bacteria and skin irritants. The pH of the water ranged from 7.1 to 7.3 and the possibility of irritating chemical substances in the tunnel water was ruled out by negative reactions when 12 men were patch tested with it. The men tested had just recovered or were still suffering from boils, hence were susceptible subjects who would have developed positive patch tests if the skin condition had been caused by the irritants in the water.

The material used for the patch tests consisted of water from the ceiling of the tunnel, rock dust from the face of the workings, and a mixture of both. A small amount of each of these substances was placed on the skin of the flexor surface of the arm above the elbow; the area was covered with cellophane, and sealed with adhesive tape. The patch tests were removed at the end of 24 hours, and read at that time and again in 48 hours and 96 hours after removal of the patches to observe delayed reactions. All tests were negative.

Bacteriological examination of the boils and tunnel water was done. On culturing the ceiling water, no growth was obtained at the end of 48 hours. However, the floor water contained abundant *Bacillus aerogenes*.

Cultures from boils were predominantly *Staphylococcus aureus* and *albus*, the ordinary bacteria found in boils. It is therefore evident that the bacterial content of the tunnel water is not the etiological factor in the outbreak of boils.

The one man suffering from dermatitis of both feet, and as a result, not working, was patch tested with tunnel water, rock dust, and rubber boot lining. He did not react to any of these substances. The presence of a moderately severe interdigital dermatophytosis suggested a fungous infection of the dorsum of his feet. Unfortunately, scrapings from the lesions for microscopic and cultural examinations were lost in transit to the laboratory.

CONCLUSIONS

The study reveals that the cause of the outbreak of boils was a combination of factors which bring about a lowering of skin resistance to pyogenic bacteria. The humid atmosphere, the perspiration, the warm tunnel water, friction from clothes and rubber coats which are infiltrated with rock dust, together with the unhygienic conditions of the tunnel, and the insanitary and dirty condition of the working clothes are the causes of the outbreak.

The bacteria found in the boils did not come from the water.

The lack of response to the patch tests leads to the conclusion that the chemicals in the concentration in which they occur in the tunnel water and rock dust do not produce pustular reactions and are not skin irritants or sensitizers.

RECOMMENDATIONS

The prime requisite in the prevention of boils among tunnel workers is personal cleanliness. This can be obtained by having—

1. Adequate, usable bathing facilities, the showers having controllable hot and cold, uncontaminated water.
2. The workmen to be furnished a toilet soap and clean towels each time they use the shower.
3. The foreman of the work gang should supervise and enforce adequate bathing after work.
4. Daily change to clean work clothes, with clean neck towels to be provided for the workmen. Each workman should have three changes of work clothes.[3]
5. Individual raincoats, rubber boots, safety hats, respirators, and neck towels.
6. Daily washing of the rubber clothing worn by the men.
7. Sanitary toilet facilities in the tunnel. If permanent ones are impractical, portable sanitary pails for toilet use are suggested.
8. The workers should be taught that if occasional boils appear in spite of these protective measures, they should seek early medical aid and not treat themselves.
9. The men should be advised not to use adhesive tape on the skin because its removal pulls out the hairs, the open hair follicles becoming new portals for infection.
10. A series of health talks should be instituted to give a background to the workmen for a practical and workable personal hygiene program.

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[3] Clean clothes and towels may be had by contracting with a laundry for this service at approximately fifteen cents a day per man.

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SANITATION ACTIVITIES IN THE SOUTHEASTERN STATES IN CONNECTION WITH NATIONAL DEFENSE [1]

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THE PRESENT NATIONAL EMERGENCY

Within the past year and a half, the protection of health has become an important item in the activities relating to the Nation's defense. One of the principal duties of a responsible health officer in a time such as this is the conservation of the health of the military and naval forces. The military and naval authorities are responsible for safeguarding the health of their personnel in the limited areas over which they have jurisdiction. However, part of a soldier's time is spent away from his post and in the surrounding civil communities and other areas, either on training or on leave. Even if this time were very brief, it could be significant, since infection with disease in some circumstances can be acquired very quickly. It therefore rests with public health officials to protect the health of the fighting personnel not only when "off duty" but also when they are on duty. It also follows that, if the forces for the defense of the country are to be trained, equipped, and maintained, the health of the workers in numerous defense industries also must be safeguarded in order that material will be produced for the armed forces as rapidly as desired. Last, but not least, the health of the public at large must be protected and controlled for the good of the people and to keep the morale of the Nation at a high level.

With the establishment of a great many new Army and Navy training centers and with the development in industrial undertakings connected with national defense have come large increases both in military and civilian population. In reviewing the list of these training camps, one is impressed with the large number of them located in the South. For example, about 110,000 military and

[1] Presented at the sixth annual meeting of the Mississippi Public Health Association, Jackson, Miss., November 6, 1941.

naval personnel have moved into the State of Florida alone. When one considers that in many areas a camp of 30,000 or more has been located near a small town, and, in some cases, more than 50 miles from any sizable city, the problems resulting in these extra-cantonment towns, not only for health control but also for the provision of facilities for the great influx of people, are enormous.

EXTRA-CANTONMENT ACTIVITIES

One of the first steps in the development of a national defense sanitation program was the assignment in November 1940 of nine senior Public Health Service medical officers as liaison officers to the nine Army Corps area headquarters to facilitate the relationship between the civil and military health authorities. This was done at the request of the Secretary of War. The main duty of these officers is to carry on an appropriate liaison whereby the civil authorities are constantly informed as to the public health needs of the military forces, and the military authorities in turn are apprised of health and sanitary conditions in areas where troops are stationed or go for recreation or maneuvers. These liaison officers are charged also with the duty of stimulating the further development, as well as the full utilization, of existing facilities in areas where armed forces or national defense employees are concentrated.

As compared with the 1917–18 defense work, better local health service facilities and experienced personnel are available at the present time than during the period of the previous World War. It is of interest to note that one of the first recommendations which the Public Health Service usually makes, after conducting a reconnaissance survey of a new extra-cantonment area, is that a local health unit be provided in that area if one does not already exist. It has not been necessary in quite a number of cases to make this recommendation, since either a county or a district health department was found to be functioning. For example, there is a county health unit in every county in Alabama, and, as a result, each of the 14 defense areas is provided with local health service. Likewise, 13 defense areas in Florida are provided with health services, 16 in Georgia, 9 in Mississippi, 11 in South Carolina, and 8 in Tennessee.

Federal funds allotted by the Public Health Service in accordance with Title VI of the Social Security Act and the Venereal Disease Acts have contributed in a large measure to the development of State and local health services in recent years.

Even with this Federal assistance in many cases the local health unit facilities were hardly great enough to meet the health needs prior to the national defense program. It has been necessary to enlarge and expand these units to care for large increases in population.

In addition to the Social Security Act, title VI, and Venereal Disease funds, the Public Health Service has obtained funds for a certain amount of emergency health and sanitation activities in defense areas. Out of this appropriation, personnel and other assistance have been furnished to various State and local health departments in defense areas where critical needs exist. Medical, public health engineering, and nursing personnel not already in the employ of official health agencies have been placed on duty for this purpose. They have been given courses in public health orientation at the National Institute of Health, Bethesda, Md., and on mosquito control at Norfolk, Va., and have been assigned to the various States and defense areas to work under the direction of State and local health authorities and not as Federal agents.

MOSQUITO CONTROL

Because of the importance of controlling mosquitoes in the vicinity of Army and Navy camps, the Public Health Service in May and June 1941, initiated an oiling program in the extra-cantonment areas in the South. Trucks, spray cans, Diesel or fuel oil for use as larvicide, and oil and gasoline for operation of the trucks were secured in connection with this program, which was operated by the State health departments with the assistance of the Public Health Service and local health units.

The program was terminated June 30, 1941, because funds for its continuance in the fiscal year 1942 were not available. Arrangements were made for a similar program to be operated by the Work Projects Administration commencing July 1, 1941. It was agreed that the Public Health Service would provide supervisory personnel to assist the State health departments and the Work Projects Administration in mosquito control work as rapidly as such personnel could be obtained through the United States Civil Service Commission and trained. In addition, the equipment formerly used in the Public Health Service program was made available through the State health departments for the operation of the program under the Work Projects Administration.

Some delays were, and still are, encountered in the present program because of lack of Work Projects Administration labor (which is scarce in the defense areas particularly) and other causes. It is necessary to have certification for each individual project as a national defense project by either the Army or Navy, as the case may be, and the Public Health Service in order that it may have some priority in obtaining Work Projects Administration labor and release from the usual sponsor's contribution requirements. The liaison officers of the Public Health Service certify those projects involving Army cantonments while the district directors of the Public Health Service certify those projects involving naval establishments.

As of November 1, 1941, the status of this program may be summarized for the States of South Carolina, Georgia, Florida, Alabama, Mississippi, and Louisiana, as follows:

National defense Work Projects Administration mosquito control projects

Drainage projects submitted to Work Projects Administration	34
Drainage projects certified as defense-connected	12
Drainage projects operating	8
Drainage projects completed	1
Larvicidal projects operating or operated since July 1, 1941, State-wide projects certified	46

RECONNAISSANCE SURVEYS OF DEFENSE AREAS

Brief mention has already been made of the reconnaissance surveys made by the Public Health Service. Since the fall of 1940, the Public Health Service has been making reconnaissance or sanitary surveys of municipal and rural areas within 25 miles of each major cantonment. A number of camps had already been completed or were under construction at that time; but since then it has been the policy to conduct surveys prior to the completion of new camps in order to be able to anticipate the needs in the extra-cantonment areas before existing facilities and services are too greatly overtaxed. The surveys are conducted usually by a team consisting of a public health engineer and a medical officer. The following number of surveys have been completed by States in Public Health Service District No. 4 to date: Alabama, 7; Florida, 12; Georgia, 6; Louisiana, 5; Mississippi, 5; South Carolina, 4; and Tennessee, 3—a total of 42.

Although there are many more defense areas than those which have been surveyed, the ones involving the largest cantonments and the so-called "hot spots" have been largely covered. However, with the proposed construction of additional camps, the need for additional surveys will develop.

The data obtained by these reconnaissance surveys have served a useful purpose in determining the immediate needs for the strengthening of the health services in the various defense areas. The information thus obtained regarding the community facility needs of various kinds, such as water supply, sewers, and hospitals, has been consulted by many of the governmental defense agencies in Washington in connection with their varied activities as being a reliable source from which factual knowledge of the environmental conditions in the defense areas can be obtained.

COMMUNITY FACILITIES LAW

In July 1941 the Community Facilities Act was approved by the President and became a law. Under this authorization the sum of

$150,000,000 was provided for construction, maintenance, and operation, by grants or loans, of facilities in communities where the national defense activities, military or industrial, have definitely caused the need for such facilities. The Public Works Administration of the Federal Works Agency was delegated to receive project applications, determine the justification for projects, determine, with the aid of various other governmental agencies, the priorities of the various projects, and to supervise construction. Among the projects which have been considered as justified under the terms of the law are those having a public health or sanitary significance, such as water plants and systems, sewer systems and treatment plants, health centers, comfort stations, venereal disease clinics, hospitals, and incinerators. In all cases it has been necessary for the applicant to demonstrate that the proposed project is an acute need which has developed because of the defense situation and does not relate to some long-standing community need.

The Public Health Service district offices have been called upon by the Regional Coordinator of the Federal Security Agency to review project applications and make recommendations regarding the public health and sanitation projects. The primary purpose has been to assist the Public Works Administration to secure urgently needed public health and sanitation facilities resulting from defense activities and to eliminate those projects which have little or no defense-connected need or justification. The State health departments have been relied upon to a great extent in this matter for recommendations.

It is believed that no worth while public health and sanitation project for which a defense-connected need has been definitely demonstrated in the application has failed to receive adequate consideration in the allocations of expenditures to be made under this Act. Funds are not allotted to any project until it has been approved by the President.

MILK SANITATION CONTROL

In the fall of 1941 Public Health Service milk sanitation personnel started special surveys of milksheds and pasteurization plants in the extra-cantonment areas. The cooperation of the State and local health departments has been obtained in an effort to provide adequate milk control in defense areas, especially of those milk plants supplying the military personnel in the cantonments. The personnel of the Army employed on milk sanitation have cooperated also in the concentrated effort to provide safe milk supplies for the military forces.

In some communities where defense projects are located a sufficient quantity of milk has not been available locally to supply the

demand; therefore, it has been necessary to go outside of the local milkshed to provide the additional milk required by the defense project. When this has been done, only milk produced on milksheds operating under the provisions of the Public Health Service Milk Ordinance has been acceptable in most instances. It is considered that the emphasis being placed on the provision of safe pasteurized milk supplies for the military and naval establishments will have a beneficial influence in bringing about improvements in milk supplies generally.

ARMY RECREATIONAL CAMPS

The War Department has placed Army recreational camps along the Gulf and Atlantic coasts, a few being located inland adjacent to lakes. The majority of these camps consist of 6-man pyramid tents with concrete floors, wooden sides to a height of 2 feet and screens to a height of about 4 feet with a screen door. At some of the camps the tents are provided with wooden floors raised distances of 6 to 18 inches above the ground level. A large tent is usually provided for the mess hall which is generally operated under contract by a local concern in a manner similar to any other food concession. For this reason and because these camps primarily provide sleeping accommodations for the men when they are on leave for the purpose of recreation in the neighboring community, they are of particular importance to the health authorities of the locality.

All of the camps, with two exceptions, are located on either the Gulf or Atlantic coasts and, as a result, swimming is a major item in the recreational program. This has necessitated investigations of the beach waters. One of the justifications advanced for sewerage systems and sewage treatment plants in some of the cities along the Gulf coast under the Public Works Administration Community Facilities program has been that the beach waters desired for use by military personnel visiting the Army recreational camps are so subject to pollution that bathing must or will be prohibited unless sewage disposal facilities are provided which will improve conditions.

WATER SUPPLY AND SEWERAGE

The War and Navy Departments have cooperated to a great extent with the State health departments and the Public Health Service in connection with the provision of water supply and sewerage facilities for cantonment areas. In most cases plans have been submitted for the approval of the State health department before construction is undertaken. Facilities provided for Army camps, exclusive of certain airfields, are under the control of the Quartermaster Corps. Plans have usually been prepared by consulting engineering firms and construction has been completed by contractors.

In the case of certain Army airfields, construction of facilities was originally under the jurisdiction of the Quartermaster Corps but this was later changed to the Corps of Engineers. It has been the policy of the Corps of Engineers to obtain the recommendations of the Public Health Service with respect to the proposed water supply and sewerage facilities for the airfields. In making recommendations regarding these proposed facilities, the Public Health Service has followed the procedure of first obtaining the views of the State health department in the matter. It is believed that in the majority of cases, final plans have been submitted for approval by the State health department, especially with reference to sewage treatment.

While at a few of the camps sewage is discharged into the sewers of a nearby municipality, in the majority of cases a sewage treatment plant is provided to serve only the camp. In contrast to the 1918 septic tank, the present-day sewage treatment plants at military cantonments are of the most modern types. For example, a single-stage biofiltration plant has been installed at Camp Polk, La.; two-stage biofiltration plants have been installed at Camp Livingston, La.,and Camp Stewart, Ga. Activated sludge plants have been constructed at Camp Shelby, Miss., and Camp Claiborne, La.; and aerofilters are provided at Camp Forrest (Peay), Tenn. The majority of treatment plants include chlorination.

The Cincinnati Stream Pollution Investigations Station of the Public Health Service has prepared a pamphlet entitled "Notes on Basic Design Data for Emergency Water and Sewage Treatment Plants in Areas Affected by National Defense Program." In this pamphlet certain types of design for sewage and water-treatment plants are suggested which can be made up on a unit basis and enlarged within reasonable limits by adding units. The designs are simplified, made more or less standard, and the units may be cheaply constructed.

GENERAL SANITATION

In May 1941 the Public Health Service prepared a "Sanitation Code for State or Local Adoption," at the request of the conference of State and Territorial health officers. This code was prepared with particular reference to defense areas and it was suggested that a similar code or ordinance be adopted locally in these areas. The code covers sanitary control of water supplies, sewage, industrial wastes, excreta, garbage and refuse, swimming pools and bathing places, milk and milk products, frozen desserts, eating and drinking establishments, habitable buildings, tourist camps, trailer camps, cabin camps, construction camps, and similar establishments.

Usually one of the first activities of a new local health organization in a defense area is to determine the enforcement powers that are

available to carry its recommendations into effect. This frequently results in the conclusion that local ordinances are necessary particularly to avoid insanitary fringe or "mushroom" developments. Time does not permit the more desirable method of securing good general sanitation by educational methods. It is necessary to have laws or ordinances with effective enforcement provisions in them to control "boom town" growths. The Sanitation Code prepared by the Public Health Service was intended to furnish the basic information needed for this purpose.

The Work Projects Administration Community Sanitation program, sponsored by State health departments, has received technical supervision and assistance from the Public Health Service. Prior to the defense activity many projects were operating and numerous Work Projects Administration workers were employed in the construction of sanitary privies. With the advent of the national emergency, such labor became scarce, particularly in defense areas, and it also became necessary to utilize existing labor for national defense projects, such as military roads and access highways, airport construction, mosquito control, and the like. It became necessary, as was the case in malaria control drainage projects, to have the community sanitation projects certified as national defense projects by the Army or Navy and by the Public Health Service in order to continue or start operation of projects in defense areas. In some nondefense counties, where Work Projects Administration labor was not scarce, operation of existing projects was continued and in a few cases it has been possible to continue operation of projects which happened to be previously operating in what later became defense counties. It is hoped that this important sanitation program may be continued in operation in spite of the limitations imposed by the defense situation.

MILITARY MANEUVERS

In the 1940 Army maneuvers in Texas and Louisiana, the State health departments and the Public Health Service were very active. In those parts of the maneuver area where local health services were not already provided, special military-area health units were set up in advance of the maneuvers. Inspections were made of milk plants, food establishments, water supplies, and other facilities before and during the maneuver period. Prostitutes were removed, and venereal disease clinics established. By the demonstration of health work afforded by these special units, some success was achieved in having full-time health units established in some of the counties involved.

During June 1941 moderate scale maneuvers were held in Tennessee by the Second Army. By this time the Public Health Service liaison officers were active in coordinating the health work of the Army, State health departments, and Public Health Service. Prior to these

maneuvers the Governor of Tennessee called a meeting which resulted in the creation of a Coordinating Unit to handle the problems of vice control, sanitation of food and food handling establishments, milk sanitation, and general communicable disease control. A unit headquarters was established and was kept open 24 hours daily. The office was connected by telephone with the Army headquarters. Appropriate personnel were provided. Meetings were held with mayors, health officers, and police chiefs from the cities in the area for cooperating in handling vice control.

This program was very effective and a similar unit was set up for the large-scale maneuvers in Arkansas Texas, and Louisiana in August and September 1941. Similar control was established for the extensive maneuvers in North and South Carolina. Special assistance was made available to State and local health authorities by the Public Health Service during these maneuvers by placing in the field several mobile trailer laboratory units equipped for the bacteriological examination of water and milk.

CONCLUSION

Many health workers are familiar in varying degrees with the information which has been given concerning the public health and sanitation activities of the Federal Government during the present national defense period. It has been noted, no doubt, that other health subjects such as venereal disease control, typhus fever control, and similar important undertakings of the Federal Government relating to communicable diseases are not covered. Neither is the need for nursing and nutritional programs in the defense areas discussed. It may be mentioned, however, that these subjects, as well as those relating to increased health center and hospital facilities, are among the health programs to which the Federal Government has given much attention, or for which the Government is formulating plans and programs which may be undertaken in the near future or in the years immediately subsequent to the present national defense period.

FREQUENCY AND DURATION OF DISABILITIES CAUSING ABSENCE FROM WORK AMONG THE EMPLOYEES OF A PUBLIC UTILITY, 1938–41 [1]

By W. M. Gafafer, *Senior Statistician, United States Public Health Service*

This, the sixth report of a series (*1–5*) on disability among employees of the Boston Edison Company, is based on recorded absences due to disability lasting 1 calendar day or longer which ended during the 4 years 1938–41, and is presented at this time principally because of

[1] From the Division of Industrial Hygiene, National Institute of Health.

the unprecedented interest in time lost shown by industry, war and health agencies, and others engaged in the war effort. Furthermore, recent and pertinent data are not available in the literature.

A detailed description of the sick leave plan of the company may be found in the earlier papers of the series. For present purposes all cases of continuous disability extending over 372 calendar days were arbitrarily closed at the end of the 372d day.

With regard to the age distribution of the employees it is sufficient to say that as of 1940 approximately 50 percent of the males were under 40 years of age while the corresponding percentage for the females was 60.

Among other things, table 1 shows for each of the 4 years, 1938–41, the number of male and female person-years of membership in the sickness plan, and four morbidity indexes. The causes of disability are broadly grouped into industrial injuries, nonindustrial injuries, respiratory diseases, and nonrespiratory diseases, respectively.

The total years of exposure for males amount to 10,926 and for females to 2,460. For male employees the number of absences lasting 1 calendar day or longer from all disabilities is 10,045 with 88,478 days of disability, and for female employees the corresponding magnitudes are 4,533 and 27,594, respectively.

The four morbidity indexes.—Interest in the table centers around the following: (1) With the exception of index III which gives the average number of days per absence, all indexes for each year show for all disabilities and each cause group (industrial injuries excepted) excesses for the females when compared with the males. Particularly noteworthy is the average annual number of absences on account of the respiratory diseases among the females for the 4-year period (946.8) which is higher than the male rate for all disabilities for the same period of time (919.4). (2) For each sex and for all disabilities the year 1939 shows in general the highest indexes, the respiratory diseases, so far as number of absences is concerned, being chiefly responsible. (3) For each year and each sex the respiratory group of diseases is the principal controlling factor of index I covering all disabilities while the corresponding factor of indexes II and IV is the nonrespiratory group of diseases. (4) With regard to index III, industrial injuries for the males and in general nonindustrial injuries for the females show for each year absences of longest average duration.

REFERENCES

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(*3*) ———: Trend of disabling sickness among employees of a public utility. Pub. Health Rep., 43: 1957–1984 (1928). (Reprint No. 1239.)

(4) Gafafer, W. M., and Frasier, Elizabeth S.: Frequency and duration of disabilities causing absence from work among the employees of a public utility, 1933–1937. Pub. Health Rep., 53: 1273–1288 (1938). (Reprint No. 1963.)

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TABLE 1.—*Indexes of morbidity for different years according to sex and broad cause group, employees of a public utility, absences ending during 1938–41, inclusive*

Cause group	Males					Females				
	1938–41	1938	1939	1940	1941	1938–41	1938	1939	1940	1941
	Index I: Annual number of absences per 1,000 employees									
All disabilities	919.4	897.5	1,025.6	858.8	894.9	1,842.7	1,929.0	2,157.6	1,679.8	1,561.2
Industrial injuries	22.3	19.4	16.8	26.6	26.6	4.5	7.4	1.6	5.1	3.5
Nonindustrial injuries	42.8	49.7	51.5	35.1	34.8	78.0	94.7	98.7	53.1	61.2
Respiratory diseases	541.8	503.2	626.8	477.4	559.6	946.8	943.8	1,130.6	864.7	832.2
Nonrespiratory diseases [1]	312.5	325.2	330.5	319.7	273.9	813.4	883.1	926.7	756.9	664.3
	Index II: Annual number of days per employee									
All disabilities	8.098	8.004	8.260	8.065	8.074	11.217	9.223	15.490	10.608	9.503
Industrial injuries	.644	.544	.540	.801	.694	.039	.086	.016	.029	.019
Nonindustrial injuries	.465	.710	.362	.398	.383	1.070	.788	1.285	1.099	1.138
Respiratory diseases	2.936	2.731	3.230	2.507	3.280	4.444	3.793	5.946	3.935	4.082
Nonrespiratory diseases [1]	4.053	4.019	4.128	4.349	3.717	5.664	4.556	8.243	5.545	4.264
	Index III: Average number of days per absence									
All disabilities	8.81	8.92	8.05	9.38	9.02	6.09	4.73	7.18	6.31	6.09
Industrial injuries	28.83	28.02	32.15	30.08	26.06	8.[illegible]	11.60	10.00	5.67	5.50
Nonindustrial injuries	10.85	14.30	7.03	11.34	11.01	13.71	8.33	13.02	20.71	18.60
Respiratory diseases	5.42	5.43	5.15	5.25	5.86	4.69	4.11	5.26	4.55	4.91
Nonrespiratory diseases [1]	12.97	12.36	12.49	13.60	13.57	6.96	5.16	8.90	7.33	6.42
	Index IV: Average daily percentage of employees disabled [2]									
All disabilities	2.22	2.19	2.26	2.21	2.21	3.07	2.53	4.24	2.91	2.60
Industrial injuries	.18	.15	.15	.22	.19	.01	.02	[3] .00	.01	[3] .00
Nonindustrial injuries	.13	.19	.10	.11	.10	.29	.22	.35	.30	.31
Respiratory diseases	.80	.75	.88	.69	.90	1.22	1.04	1.63	1.08	1.12
Nonrespiratory diseases [1]	1.11	1.10	1.13	1.19	1.02	1.55	1.25	2.26	1.52	1.17
	Number of absences									
All disabilities	10,045	2,495	2,808	2,324	2,418	4,533	1,304	1,355	981	893
Industrial injuries	244	54	46	72	72	11	5	1	3	2
Nonindustrial injuries	468	138	141	95	94	192	64	62	31	35
Respiratory diseases	5,919	1,399	1,716	1,202	1,512	2,329	638	710	505	476
Nonrespiratory diseases [1]	3,414	904	905	865	740	2,001	597	582	442	380
	Number of calendar days of disability [4]									
All disabilities	88,478	22,250	22,617	21,796	21,815	27,594	6,235	9,728	6,195	5,436
Industrial injuries	7,034	1,513	1,479	2,166	1,876	96	58	10	17	11
Nonindustrial injuries	5,076	1,973	991	1,077	1,035	2,633	533	807	642	651
Respiratory diseases	32,082	7,593	8,843	6,785	8,861	10,931	2,564	3,734	2,298	2,335
Nonrespiratory diseases [1]	44,286	11,171	11,304	11,768	10,043	13,934	3,080	5,177	3,238	2,439
Number of person-years of membership	10,926	2,780	2,738	2,706	2,702	2,460	676	628	584	572

[1] Including disability from ill-defined and unknown causes.
[2] The average daily percentage of employees disabled is obtained by dividing the number of days of disability by the person-*days* of membership.
[3] Less than .01 percent.
[4] The number of days of disability is the number of calendar days from the date disability began to the date disability ended, or to the 372d day, inclusive.

INCIDENCE OF HOSPITALIZATION, MARCH 1942

[Reported for nonprofit Blue Cross Hospital Service Plans by the Hospital Service Plan Commission of the American Hospital Association]

The following table inaugurates a new current index of illness. Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 8,000,000 members of Blue Cross Hospital Service Plans will be presented monthly. These plans provide prepaid hospital service and it is believed that the admission rate per 1,000 will reflect rather accurately the prevalence of serious illness among the members. The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	March	
	1942	1941
1. Number of Plans supplying data	62	45
2. Number of persons eligible for hospital care	8, 265, 831	4, 858, 368
3. Number of persons admitted for hospital care	73, 069	41, 443
4. Incidence per 1,000 persons, annual rate, during current month	104. 0	100.[illegible]
5. Incidence per 1,000 persons, annual rate, for the 12 months ended March 31	106. 0	

DEATHS DURING WEEK ENDED APRIL 11, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Apr 11, 1942	Corresponding week, 1941
Data from 87 large cities of the United States:		
Total deaths	8, 610	8, 447
Average for 3 prior years	8, 629	
Total deaths, first 14 weeks of year	120, 985	130, 430
Deaths per 1,000 population, first 14 weeks of year, annual rate	12 8	13 1
Deaths under 1 year of age	536	462
Average for 3 prior years	488	
Deaths under 1 year of age, first 14 weeks of year	7, 867	7, 380
Data from industrial insurance companies:		
Policies in force	64, 963, 030	64, 566, 401
Number of death claims	11, 810	11, 620
Death claims per 1,000 policies in force, annual rate	9 5	9 4
Death claims per 1,000 policies, first 14 weeks of year, annual rate	10 2	10 8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED APRIL 18, 1942

Summary

General health conditions in the United States continue favorable according to current State morbidity reports and urban mortality.

Of the 9 common communicable diseases for which weekly comparative data for earlier years are available, the current incidence of only two—measles and meningococcus meningitis—is above the 5-year (1937–41) median.

The incidence of meningitis declined sharply, dropping from 112 cases for the preceding week [1] to 88 cases for the current week. A seasonal decline is expected about this time of year. The current incidence, however, is still above the 5-year median (55 cases) and higher than that for any corresponding week since 1937 (192 cases). The incidence of measles continues rather high, following a season of maximum incidence so far as indicated by reports to the Public Health Service. The number of cases currently reported is a little less than half that reported for the corresponding week last year and about 60 percent above the 5-year (1937–41) median.

Of 45 cases of amebic dysentery, 29 occurred in Louisiana, and of 62 cases of bacillary dysentery, 41 cases were reported in Texas. One case of anthrax was reported in Pennsylvania.

The seasonal rise in the incidence of Rocky Mountain spotted fever is indicated with reports of 7 cases for the week, of which 6 occurred in the northwestern States and 1 case in Illinois. The incidence of smallpox and typhoid fever continues low, with 21 and 82 cases, respectively. Of 23 cases of endemic typhus fever, 5 cases each were reported in South Carolina, Georgia, and Texas.

The crude death rate for the current week for 88 large cities in the United States is 12.2 per 1,000 population, as compared with 12.1 for the preceding week and 12.4 for the 3-year (1939–41) average for the corresponding week. The accumulated rate to date is 12.7, as compared with 13.1 for the corresponding period of 1941.

[1] A corrected report from Texas shows only 7 cases for the week ended April 11, 1942, instead of 23 cases as originally reported.

Telegraphic morbidity reports from State health officers for the week ended April 18, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report while leaders imply that, although none were reported cases may have occurred

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Apr. 18, 1942	Apr. 19, 1941		Apr. 18, 1942	Apr. 19, 1941		Apr. 18, 1942	Apr. 19, 1941		Apr. 18, 1942	Apr. 19, 1941	
NEW ENG.												
Maine	0	2	2	2	------	10	135	135	114	5	0	0
New Hampshire	0	0	0	------	------	------	34	72	30	0	0	0
Vermont	2	2	1	------	------	------	100	73	48	0	0	0
Massachusetts	4	2	2	------	------	------	1,314	746	714	2	1	1
Rhode Island	0	0	0	------	1	------	264	5	51	0	0	0
Connecticut	0	0	1	8	2	4	565	270	276	0	0	0
MID. ATL.												
New York	19	13	30	[1] 14	[1] 16	[1] 16	784	6,971	1,839	16	3	4
New Jersey	3	12	12	6	19	11	829	4,269	977	4	1	1
Pennsylvania	12	11	23	------	------	------	1,264	5,928	737	9	6	11
E. NO. CEN.												
Ohio	3	7	12	9	16	16	538	4,746	900	0	2	2
Indiana	5	10	9	22	11	24	143	1,487	203	1	0	0
Illinois	17	21	23	6	21	26	665	3,451	209	0	2	2
Michigan [2]	8	0	7	3	7	7	437	4,503	671	3	6	4
Wisconsin	1	0	0	56	104	62	953	2,017	581	0	2	1
W. NO. CEN.												
Minnesota	2	0	1	1	2	2	887	24	121	0	0	1
Iowa	7	3	4	------	8	8	328	290	196	1	0	0
Missouri	7	3	7	5	5	18	721	518	45	6	1	1
North Dakota	1	2	0	6	6	13	55	32	26	0	1	1
South Dakota	2	0	1	------	------	------	17	7	6	0	0	0
Nebraska	2	3	1	66	------	------	349	8	67	0	0	0
Kansas	5	7	7	4	11	11	583	1,084	638	1	1	0
SO. ATL.												
Delaware	0	0	0	------	------	------	13	208	31	1	0	0
Maryland [2]	4	2	4	9	9	9	521	378	378	8	4	1
Dist. of Col.	0	0	2	2	3	2	82	346	94	2	1	1
Virginia	10	7	9	313	324	224	322	2,589	668	7	4	4
West Virginia	2	2	5	5	13	44	159	889	53	0	1	2
North Carolina	11	5	12	21	4	7	1,130	1,776	538	1	0	2
South Carolina	3	4	4	411	448	429	211	1,365	48	1	1	0
Georgia	7	5	6	48	76	76	203	697	155	1	0	1
Florida	2	0	4	8	117	8	297	1,145	107	0	0	0
E. SO. CEN.												
Kentucky	4	3	8	------	27	27	126	1,039	315	0	2	2
Tennessee	3	9	6	49	69	147	114	790	154	1	4	1
Alabama	7	5	10	136	148	148	137	622	134	6	0	3
Mississippi [2]	8	4	4	------	------	------	------	------	------	2	2	1
W. SO. CEN.												
Arkansas	4	5	5	51	103	95	168	467	62	1	0	0
Louisiana	9	8	5	7	14	14	251	70	15	0	0	1
Oklahoma	8	7	7	137	156	156	331	106	106	0	0	0
Texas	28	22	22	690	530	555	2,104	1,160	1,011	[2] 7	5	5
MOUNTAIN												
Montana	0	0	1	3	2	7	106	32	25	0	0	0
Idaho	0	0	1	------	1	2	92	54	42	0	0	0
Wyoming	1	0	0	138	------	------	79	74	46	0	0	0
Colorado	1	10	10	42	42	6	279	522	435	0	0	0
New Mexico	4	2	1	10	2	2	65	264	80	0	0	1
Arizona	0	4	2	100	84	84	155	104	104	0	0	0
Utah [2]	0	0	0	------	10	10	519	57	110	0	0	0
Nevada	0	0	------	------	------	------	130	0	------	0	0	------
PACIFIC												
Washington	0	1	1	------	------	------	209	159	159	0	0	0
Oregon	0	5	3	21	15	39	203	365	70	1	0	0
California	8	16	16	267	315	145	6,930	247	504	1	5	1
Total	224	219	335	2,666	2,741	2,741	25,991	52,767	15,056	88	55	55
15 weeks	4,486	4,288	7,242	67,226	469,577	157,526	254,949	482,945	196,334	[2] 1,153	766	766

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended April 18, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41
	Apr 18, 1942	Apr 19, 1941		Apr 18, 1942	Apr 19, 1941		Apr 18, 1942	Apr 19, 1941		Apr 18, 1942	Apr 19, 1941	
NEW ENG												
Maine	0	0	0	6	5	15	0	0	0	1	2	2
New Hampshire	0	0	0	12	4	4	0	0	0	0	0	0
Vermont	0	0	0	5	7	13	0	0	0	0	0	0
Massachusetts	0	1	0	462	152	200	0	0	0	2	0	0
Rhode Island	1	0	0	8	3	18	0	0	0	0	0	0
Connecticut	0	0	0	37	75	102	0	0	0	2	1	0
MID ATL.												
New York	3	0	0	457	531	918	0	0	0	9	1	5
New Jersey	0	0	0	167	443	214	0	0	0	0	1	2
Pennsylvania	0	0	0	290	401	401	0	0	0	3	8	8
E NO CEN												
Ohio	1	2	1	311	258	359	0	0	2	3	1	1
Indiana	0	0	0	115	154	172	1	0	14	1	0	1
Illinois	0	0	1	281	413	565	1	2	10	7	3	4
Michigan [2]	0	0	0	122	326	474	2	7	7	0	2	2
Wisconsin	1	0	0	148	156	164	0	6	6	1	0	1
W NO CEN												
Minnesota	0	1	1	76	41	80	0	3	4	0	0	0
Iowa	0	0	0	51	52	186	0	1	46	1	1	1
Missouri	0	0	0	116	130	130	3	1	23	1	1	2
North Dakota	0	0	0	22	5	13	1	1	5	0	0	0
South Dakota	0	0	0	22	11	19	0	0	4	0	0	0
Nebraska	0	0	0	36	13	27	0	0	3	0	0	0
Kansas	0	1	1	90	47	81	0	1	3	0	0	1
SO ATL.												
Delaware	0	0	0	53	8	11	0	0	0	0	0	0
Maryland [2]	0	0	0	63	50	50	0	0	0	2	0	1
Dist of Col	0	0	0	15	14	19	0	0	0	0	1	1
Virginia	1	1	0	39	20	29	0	0	0	0	3	2
West Virginia	0	0	1	29	34	29	0	0	0	3	4	1
North Carolina	0	0	0	22	17	20	0	0	0	2	0	2
South Carolina	1	0	1	4	11	6	0	1	0	1	0	1
Georgia	0	0	0	17	15	10	0	0	0	2	2	2
Florida	0	1	0	5	9	9	0	0	0	6	6	5
E SO CEN.												
Kentucky	1	1	0	73	112	80	0	0	2	4	2	4
Tennessee	1	0	1	44	92	66	4	0	0	2	6	2
Alabama	0	0	1	26	6	12	0	0	0	4	0	2
Mississippi [2]	0	0	0	7	1	2	1	0	0	3	1	3
W SO CEN												
Arkansas	0	0	0	6	10	3	3	0	1	3	6	1
Louisiana	0	0	0	8	5	6	0	0	0	6	4	6
Oklahoma	0	2	0	17	22	22	4	1	7	0	6	1
Texas	0	1	1	56	102	102	0	3	11	6	6	10
MOUNTAIN												
Montana	0	0	0	20	28	28	0	0	1	0	0	0
Idaho	0	0	0	0	4	8	0	0	3	1	1	0
Wyoming	0	0	0	15	11	7	1	0	0	0	0	0
Colorado	0	0	0	26	36	34	0	0	6	0	0	0
New Mexico	1	0	0	10	8	12	0	0	0	0	0	1
Arizona	0	0	0	3	5	8	0	0	0	0	0	1
Utah [2]	0	0	0	16	8	18	0	0	0	0	0	0
Nevada	0	0	-----	5	0	-----	0	0	-----	0	0	-----
PACIFIC												
Washington	1	1	0	34	24	34	0	1	4	3	2	1
Oregon	0	0	0	2	5	26	0	8	8	0	0	0
California	2	1	2	82	102	181	0	0	18	3	2	4
Total	14	13	14	3,531	3,986	4,881	21	36	306	82	73	90
15 weeks	326	347	323	59,424	57,095	77,735	342	669	4,698	1,125	1,134	1,644

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended April 18, 1942—Continued

Division and State	Whooping cough: Week ended— Apr 18, 1942	Whooping cough: Week ended— Apr 19, 1941	Week ended Apr 18, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	15	45	0	0	0	0	0	0	0	0	0
New Hampshire	17	14	0	0	0	0	0	0	0	0	0
Vermont	56	22	0	0	0	0	0	0	0	0	0
Massachusetts	243	151	0	0	0	0	0	0	0	0	0
Rhode Island	26	10	0	0	0	0	0	0	0	0	0
Connecticut	87	44	0	0	0	0	0	0	0	0	0
MID ATL.											
New York	433	230	0	4	11	0	0	0	0	0	0
New Jersey	282	102	0	2	0	0	0	0	0	0	0
Pennsylvania	163	318	1	0	0	0	0	0	0	0	0
E NO CEN											
Ohio	187	284	0	0	0	0	0	0	0	0	0
Indiana	67	45	0	0	0	0	0	0	0	0	0
Illinois	176	84	0	1	4	0	2	0	1	0	0
Michigan [1]	135	336	0	0	0	0	0	0	0	0	0
Wisconsin	168	100	0	0	0	0	1	0	0	0	0
W NO. CEN.											
Minnesota	30	119	0	0	0	0	0	0	0	0	0
Iowa	16	25	0	0	0	0	0	0	0	0	0
Missouri	18	42	0	0	0	0	0	0	0	0	0
North Dakota	17	23	0	2	0	0	0	0	0	0	0
South Dakota	2	50	0	0	0	0	0	0	0	0	0
Nebraska	11	33	0	0	0	0	0	0	0	0	0
Kansas	63	105	0	0	0	0	0	0	0	0	0
SO ATL.											
Delaware	4	2	0	0	0	0	0	0	0	0	0
Maryland [2]	45	81	0	0	0	0	0	0	0	0	0
Dist of Col	19	13	0	0	0	0	0	0	0	0	0
Virginia	43	110	0	0	0	18	0	0	0	0	0
West Virginia	26	54	0	0	0	0	0	0	0	0	0
North Carolina	95	223	0	0	0	0	0	0	0	0	1
South Carolina	89	246	0	0	0	0	0	0	0	0	5
Georgia	20	39	0	1	1	0	0	0	0	3	5
Florida	12	19	0	0	0	0	0	0	0	0	0
E SO CEN.											
Kentucky	91	110	0	1	1	0	0	0	0	0	0
Tennessee	26	62	0	0	0	0	0	0	0	2	0
Alabama	101	34	0	0	0	0	0	0	0	0	3
Mississippi [2]	------	------	0	0	0	0	0	0	0	2	0
W SO CEN.											
Arkansas	7	13	0	0	0	0	0	0	0	1	0
Louisiana	8	10	0	29	4	0	0	0	0	3	4
Oklahoma	16	45	0	0	0	0	0	0	0	0	0
Texas	201	229	0	4	41	0	0	0	0	0	5
MOUNTAIN											
Montana	12	5	0	0	0	0	0	0	1	1	0
Idaho	2	1	0	0	0	0	0	0	1	0	0
Wyoming	15	1	0	0	0	0	0	0	1	0	0
Colorado	40	201	0	0	0	0	0	0	2	0	0
New Mexico	44	8	0	0	0	0	0	0	0	0	0
Arizona	54	26	0	0	0	10	0	0	0	0	0
Utah [2]	58	73	0	0	0	0	0	0	0	0	0
Nevada	14	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	50	120	0	0	0	0	0	0	1	0	0
Oregon	26	21	0	0	0	0	0	0	0	0	0
California	309	612	0	1	0	0	1	1	0	0	0
Total	3,645	4,540	1	45	62	28	4	1	7	12	23
15 weeks	57,746	66,380									

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Correction: Meningococcus meningitis, week ended Apr. 11, 1942, Texas, 7 cases.

WEEKLY REPORTS FROM CITIES

City reports for week ended April 4, 1942

This table lists the reports from 86 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Atlanta, Ga.	0	0	5	2	3	0	3	0	2	0	0	0
Baltimore, Md.	0	0	1	1	408	4	17	0	27	0	0	23
Barre, Vt.	0	0	------	0	0	0	0	0	0	0	0	1
Billings, Mont.	0	0	------	0	12	0	1	0	1	0	0	0
Birmingham, Ala.	0	0	9	3	3	0	2	0	2	0	0	7
Boston, Mass.	0	0	------	0	176	6	16	0	107	0	1	52
Bridgeport, Conn.	0	1	------	0	20	0	0	0	2	0	0	1
Brunswick, Ga.	0	0	------	0	28	0	0	0	0	0	0	0
Buffalo, N. Y.	0	0	------	0	30	0	6	0	17	0	0	0
Camden, N. J.	0	0	------	0	3	0	3	0	8	0	0	1
Charleston, S. C.	0	0	21	0	3	0	0	1	0	0	0	0
Charleston, W. Va.	0	0	------	0	0	0	0	0	0	0	0	0
Chicago, Ill.	6	0	3	2	129	1	29	0	89	1	0	105
Cincinnati, Ohio	0	0	------	1	0	0	5	0	22	0	1	0
Cleveland, Ohio	1	0	11	0	6	1	8	0	78	0	0	15
Columbus, Ohio	1	0	------	0	18	0	3	0	12	0	0	5
Concord, N. H.	0	0	------	0	0	0	3	0	3	0	0	0
Cumberland, Md.	0	0	------	0	2	0	0	0	2	0	0	0
Dallas, Tex.	1	0	1	1	222	0	0	0	7	0	0	3
Denver, Colo.	5	0	14	0	99	1	8	0	5	0	0	7
Detroit, Mich.	3	0	------	0	52	0	22	0	134	0	0	45
Duluth, Minn.	0	0	------	0	4	0	0	0	6	0	0	2
Fall River, Mass.	0	0	------	0	28	0	0	0	55	0	0	0
Fargo, N. Dak.	0	0	------	0	0	0	1	0	0	0	0	0
Flint, Mich.	0	0	------	0	2	0	1	0	7	0	0	4
Fort Wayne, Ind.	0	0	------	0	0	0	1	0	1	0	0	0
Frederick, Md.	0	0	------	0	1	0	0	0	0	0	0	0
Galveston, Tex.	0	0	------	0	12	1	2	0	0	0	1	0
Grand Rapids, Mich.	0	0	------	0	3	0	2	0	0	0	0	4
Great Falls, Mont.	0	0	------	0	45	0	1	0	0	0	0	0
Hartford, Conn.	0	0	------	0	20	0	1	0	1	0	0	2
Helena, Mont.	0	0	------	0	1	0	0	0	0	0	0	1
Houston, Tex.	2	0	------	0	73	0	9	0	1	0	0	7
Indianapolis, Ind.	0	0	------	0	35	0	9	0	20	0	0	14
Kansas City, Mo.	2	0	1	1	106	0	2	0	38	0	0	1
Kenosha, Wis.	0	0	------	0	3	0	0	0	2	0	0	5
Little Rock, Ark.	0	0	6	0	87	0	5	0	0	0	0	1
Los Angeles, Calif.	6	0	14	3	569	1	13	0	24	0	2	27
Lynchburg, Va.	0	0	------	1	1	0	3	0	0	0	0	14
Memphis, Tenn.	0	0	6	0	10	0	11	0	4	4	1	8
Milwaukee, Wis.	0	0	3	3	129	0	5	0	40	0	0	38
Minneapolis, Minn.	0	0	------	1	156	0	5	0	20	0	0	1
Missoula, Mont.	0	0	------	0	0	0	2	0	1	0	0	1
Mobile, Ala.	0	0	1	1	0	0	3	0	0	0	0	0
Nashville, Tenn.	0	0	------	0	0	0	4	0	2	0	0	2
Newark, N. J.	0	0	------	0	177	1	6	0	25	0	0	22
New Haven, Conn.	0	0	------	0	184	0	2	0	2	0	0	11
New Orleans, La.	0	0	1	1	18	0	6	0	3	0	1	3
New York, N. Y.	26	0	15	1	52	26	66	1	304	0	1	235
Omaha, Nebr.	1	0	------	0	69	0	2	0	5	0	0	0
Philadelphia, Pa.	1	0	3	2	17	1	15	0	189	0	0	46
Pittsburgh, Pa.	2	0	2	0	9	1	7	1	15	0	0	23
Portland, Maine	0	0	------	0	3	2	4	0	4	0	0	0
Providence, R. I.	0	0	------	0	175	0	4	0	8	0	1	37
Pueblo, Colo.	0	0	------	0	6	0	0	0	1	0	0	1
Reading, Pa.	0	0	------	0	3	0	1	0	1	0	0	3
Richmond, Va.	0	0	6	2	0	0	2	0	0	0	0	0
Roanoke, Va.	0	0	------	0	0	0	0	0	0	0	0	1
Rochester, N. Y.	0	0	------	0	12	0	4	0	5	0	1	3

See footnotes at end of table.

City reports for week ended April 4, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Sacramento, Calif	1	0	1	0	95	0	4	0	2	0	0	17
St Joseph, Mo	0	0	------	0	2	0	2	0	1	0	0	0
St. Louis, Mo	0	0	------	0	238	0	21	0	26	0	1	7
St Paul, Minn	0	0	------	0	347	0	5	0	4	0	0	17
Salt Lake City, Utah	0	0	------	0	13	0	2	0	7	0	0	19
San Antonio, Tex	1	0	------	0	22	0	4	0	6	0	1	0
San Francisco, Calif	1	0	1	0	210	1	10	0	5	0	0	3
Savannah, Ga	0	0	16	2	15	0	2	0	1	0	0	0
Seattle, Wash	0	0	------	0	21	0	3	0	3	0	0	19
South Bend, Ind	0	0	------	0	2	0	3	0	14	0	0	0
Spokane, Wash	0	0	------	0	38	0	0	0	5	0	0	7
Springfield, Ill	0	0	------	0	238	0	2	0	0	0	0	0
Springfield, Mass	0	0	------	0	26	0	5	0	12	0	0	6
Superior, Wis	0	0	------	0	0	0	0	0	1	0	0	0
Syracuse, N. Y	0	0	------	0	48	0	1	0	4	0	0	17
Tacoma, Wash	0	0	------	0	0	0	3	0	2	0	0	5
Tampa, Fla	0	0	1	1	7	0	0	0	1	0	4	2
Terre Haute, Ind	0	0	------	0	8	0	2	0	0	0	0	0
Topeka, Kans	0	0	------	0	8	0	8	0	5	0	0	4
Trenton, N. J	0	0	------	0	1	0	2	0	3	0	0	2
Washington, D. C	1	0	3	2	91	2	9	0	8	0	1	15
Wheeling, W. Va	0	0	------	0	11	0	4	0	2	0	0	0
Wichita, Kans	0	0	2	0	50	0	3	0	2	0	0	5
Wilmington, Del	0	0	------	0	1	0	4	0	8	0	0	0
Wilmington, N C	0	0	------	0	29	0	2	0	0	0	0	0
Winston-Salem, N. C	0	0	------	0	69	0	0	0	0	0	0	0
Worcester, Mass	1	0	------	0	5	0	6	0	8	0	0	28

Dysentery, amebic.—Cases: Baltimore, 1; Boston, 1; Chicago, 1; Detroit, 1; Little Rock, 1; Los Angeles, 1; Newark, 1, New York, 3, Omaha, 1.
Dysentery, bacillary.—Cases. Baltimore, 1.
Leprosy.—Cases. New York, 1.
Tularemia.—Cases. Atlanta, 1; Cleveland, 1.
Typhus fever.—Cases: New York, 1; Sacramento, 1; Savannah, 1.

Rates (annual basis) per 100,000 population for a group of 86 selected cities (population, 1942, 33,845,414)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended April 4, 1942	9.55	22.65	4.78	742.42	66.55	219.85	0.77	2.62	147.12
Average for week 1937-41	15.39	54.73	10.88	1,301.13	99.19	295.08	3.42	3.11	180.66

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—A rat found on March 23, 1942, in Paauhau, Hamakua District, Island of Hawaii, T. H., has been proved positive for plague.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended March 21, 1942.—During the week ended March 21, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	--------	2	1	3	9	1	--		2	18
Chickenpox	------	10	1	219	276	40	45	21	295	907
Diphtheria	1	19	-----	40	4	4	--		1	69
German measles	-------	1	-----	23	105	2	17	32	55	235
Influenza	--------	22	------		8	4	----		22	56
Measles	--------	4	3	447	183	204	34	26	29	930
Mumps	1	31	1	719	469	123	184	81	530	2 139
Pneumonia	------	8	--		16	7			24	55
Scarlet fever	3	14	11	81	378	55	29	109	41	721
Smallpox	-------	-------	----	--	--	--	1			1
Trachoma	-----	------	-----	---	---	-	--	-	2	2
Tuberculosis	4	3	17	90	51	[1] 52	19	1	5	242
Typhoid and paratyphoid fever	--------	-----	3	8	1	-------	1	---	1	14
Undulant fever	-------	-----	-------	1	1	----	--		1	3
Whooping cough	--------	12	-------	178	52	3	1	5	53	304
Other communicable diseases	1	32	-------	7	230	45	1		8	324

[1] For the period Feb 26 to Mar 25, 1942

COSTA RICA

Communicable diseases—February 1942.—During the month of February 1942, certain communicable diseases were reported in Costa Rica as follows:

Disease	Cases	Deaths
Diphtheria	17	-------
Measles	54	----------
Typhoid and paratyphoid fever	22	1
Whooping cough	12	----------

IRAQ

Cerebrospinal meningitis.—During the period January 1 to March 22, 1942, 190 new cases of cerebrospinal meningitis, with 43 deaths, were reported among the civilian population of Iraq. During the same period of 1941, 31 cases of the same disease with 5 deaths were reported.

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases, P, present]

NOTE. Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates

Place		January-December 1941	January-February 1942	March 1942—week ended— 7	14	21	28
ASIA							
Afghanistan Southern Province	C	P					
Ceylon	C	3					
China:							
Canton	C	464					
Hong Kong	C	1,667					
Macao	C	1,875					
Shanghai	C	834					
India	C	97,923	4,828				[illegible]
Bombay	C	15					
Calcutta	C	2,160	98				
Rangoon	C	116	1				
India (French)	C	34					
Japan Taiwan	C	2					

PLAGUE

[C indicates cases, P, present]

Place		January-December 1941	January-February 1942	March 1942—week ended— 7	14	21	28
AFRICA							
Belgian Congo	C	[1] 39					
British East Africa							
Kenya	C	783	[2] 170				
Nairobi	C	264	61				
Tanganyika Territory	C	17					
Uganda	C	216	[8] 59				
Egypt Port Said	C	10					
Madagascar	C	285	41				[3] 23
Morocco	C	2,210	38	9	11	41	14
Casablanca [4]	C	4					
Tunisia Tunis	C	2					
Union of South Africa	C	74	2				
ASIA							
China							
Chekiang	C	[5] 125					
Fukien Province [6]							
Foochow	C	8					
Hunan Province	C	[7] 7					
Dutch East Indies:							
Java and Madura	C	618					
West Java	C	429					
India	C	4,212	818				
Calcutta	C	8					
Rangoon	C	9					
Indochina (French)	C	26	[8] 17				[8] 27
Palestine Haifa	C	10	4				
Plague-infected rats		72					
Thailand. Lampang Province	C	3					
EUROPE							
Portugal Azores Islands	C	8					

[1] Includes 21 cases of pneumonic plague.
[2] For the month of January.
[3] For the month of March.
[4] A report dated June 23, 1941, stated that an outbreak of plague had occurred in Casablanca, Morocco, where several deaths had been reported.
[5] October 2 to December 6, 1941.
[6] A report dated Nov. 22, 1941, stated that bubonic plague had appeared in epidemic form in Shaowu and Yangkow, Fukien Province, China.
[7] For November and December 1941.
[8] For the month of February.

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER—Continued

PLAGUE—Continued

Place		January-December 1941	January-February 1942	March 1942—week ended— 7	14	21	28
NORTH AMERICA							
Canada—Alberta—Plague-infected ground squirrel		1					
SOUTH AMERICA							
Argentina.							
Buenos Aires Province	C	3					
Cordoba Province	C	[9] 30	7				
Mendoza Province	C	3					
Santa Fe Province—Plague-infected rats		67					
Santiago del Estero Province	C	2					
Brazil:							
Alagoas State	C	45					
Bahia State	C	12					
Pernambuco State	C	96					
Rio de Janeiro State	C	2					
Chile.							
Santiago	C	[10] 1					
Valparaiso	C	2	[8] 1				
Ecuador	C	[11] 33					
Peru.							
Ancash Department	C	10	6				
Lambayeque Department	C	3					
Libertad Department	C	12	2				
Salaverry—Plague-infected rats			P				
Lima Department	C	24	14				
Moquegua Department—Ilo	C	7					
Piura Department	C	11	3				
OCEANIA							
Hawaii Territory.[12] Plague-infected rats		75	10				
New Caledonia	C	11					

[8] For the month of February.
[9] Includes 3 cases of pneumonic plague.
[10] Imported.
[11] January to April inclusive.
[12] During April and May 1941, 4 lots of plague-infected fleas were also reported in Hawaii Territory.

SMALLPOX

[C indicates cases]

Place		January-December 1941	January-February 1942	7	14	21	28
AFRICA							
Algeria	C	935	245				
Angola	C	192					
Belgian Congo	C	682	82				
British East Africa	C	72					
Dahomey	C	467	23				
French Guinea	C	45	58				
French West Africa	C	3					
Gold Coast	C	1,016					
Ivory Coast	C	40	29				
Morocco [1]	C	648	726	47	52	53	
Nigeria	C	1,026	206	29			
Niger Territory	C	273	113				
Portuguese East Africa	C	9					
Portuguese Guinea	C	20					
Rhodesia: Southern	C	86					
Senegal	C	65	9				
Sierra Leone	C	15					
Sudan (Anglo-Egyptian)	C	7					
Sudan (French)	C	19					
Tunisia: Tunis	C	1					
Union of South Africa	C	888		8			

[1] A report dated Dec. 31, 1941, stated that an epidemic of smallpox had occurred near Casablanca, Morocco, where about 100 cases per week were reported.

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases]

Place		January-December 1941	January-February 1942	March 1942—week ended— 7	14	21	28
ASIA							
Ceylon	C	114	2				
China	C	259					
Chosen	C	606					
Dutch East Indies—Bali Island	C	3					
India	C	25,079	3,340				
India (French)	C	9					
India (Portuguese)	C	70					
Indochina (French)	C	1,298	679				[1] 613
Iran	C	8	20				
Iraq	C	1,593	94				
Japan	C	200					
Palestine	C		1				
Straits Settlements	C	1					
Syria	C	1					
Thailand	C	315					
EUROPE							
France:							
Seine Department	C		41	3	6	4	4
Unoccupied zone	C		13				
Portugal	C	53	17		4		
Spain	C	457	27	6			
Switzerland	C	1					
NORTH AMERICA							
Canada	C	25				1	
Dominican Republic	C	2					
Guatemala	C	6					
Mexico	C	321					
Panama Canal Zone (alastrim)	C	11					
SOUTH AMERICA							
Bolivia	C	324					
Brazil	C	1					
Colombia	C	1,086	3				
Paraguay	C	8					
Peru	C	1,841					
Uruguay	C	7					
Venezuela (alastrim)	C	254	45				

[1] For the month of March.

TYPHUS FEVER

[C indicates cases; D, deaths]

AFRICA							
Algeria	C	12,827	9,196				
Basutoland	C	69	3				
British East Africa: Kenya	C	12	4				
Egypt	C	9,324	3,417	675			
French West Africa	C		7				
Morocco [1]	C	1,471	4,384	983	988	1,280	1,544
Sierra Leone	C	7					
Tunisia	C	7,078	4,165	874	582	811	
Union of South Africa	C	787					
ASIA							
China	C	215					
Chosen	C	425					
Dutch East Indies: Sumatra	C	136					
India	C	4	8				
Iran	C	115	19				
Iraq	C	53	8				
Japan	C	864					
Malaya: Unfederated States	C	1					
Palestine	C	284	12	1	2		
Straits Settlements	C	8					
Syria	C		10				
Trans-Jordan	C	9					

[1] Information dated Dec. 31, 1941, reports typhus fever in epidemic form in Casablanca, Morocco.

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths]

Place		January-December 1941	January-February 1942	March 1942—week ended— 7	14	21	28
EUROPE							
Bulgaria	C	289	94				
Czechoslovakia	C	28					
France:							
Seine Department	C			1			
Unoccupied zone [2]	C	2	4		6		35
Germany	C	2,158	[4] 85				
Gibraltar	C	2					
Greece	C	7					
Hungary	C	652	228	32	23	41	34
Irish Free State	C	26			2		
Poland	C	3,786					
Portugal	C	50					
Rumania	C	1,827	1,382	154	161	171	200
Spain	C	9,560	1,975	250			
Switzerland	C	5					
Turkey	C	704	[4] 86	49	14	26	18
Union of Soviet Socialist Republics [5]	C		[3] 16				
Yugoslavia	C	86					
NORTH AMERICA							
Guatemala	C	191	28				
Jamaica	C		9				
Mexico	C	222	37				
Panama Canal Zone	C	5	1				
Puerto Rico	C	12	3				
Salvador	D	[6] 19					
SOUTH AMERICA							
Bolivia	C	493					
Brazil	C	1					
Chile	C	337					
Colombia	C	11					
Ecuador	C	127	14				
Peru	C	1,4[illegible]5					
Venezuela	C	50					
OCEANIA							
Australia	C	15	4				
Hawaii Territory	C	60	14	1	2		

[2] The following additional cases have been reported: Feb. 27-Apr. 7, Marseille, 125 (almost all convicts), Toulouse, 1; Drome Department, 1; Gard, 5; Isere, 1.
[3] For the week ended Jan 3, 1942.
[4] For the month of February
[5] See also PUBLIC HEALTH REPORTS of Mar. 13, 1942, p. 407.
[6] October to December, inclusive.

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January-December 1941	January-February 1942	March 1942—week ended— 7	14	21	28
AFRICA							
Belgian Congo							
Aba	C	[1] 2					
Kimvulu	C	1					
Libenge [2]	C	1					
Stanleyville	D	[1] 1					
British East Africa: Uganda	C	1					
Dahomey: Grand Popo	C	[1] 2					
French Equatorial Africa							
Gabon	C	2					
Mayumba	C	[3] 4					
French Guinea	C	3					
French West Africa	C	5	1				
Gold Coast	C	4					
Accra	C	2					
Ivory Coast	C	[4] 8	1				
Nigeria	C	[1] 1					
Senegal.[5]							
Sierra Leone: Freetown	C		2				
Spanish Guinea	D	4					
Sudan (French)	C	[6] 11	1				
Togo. Hohoe	C		1				
SOUTH AMERICA [7]							
Brazil							
Acre Territory	D	1					
Amazonas State	D	4					
Bahia State	D	8					
Para State	D	8					
Colombia							
Antioquia Department	D	3					
Boyaca Department	D	8	2				
Intendencia of Meta	D	15	1				
Santander Department	D	20	1				
Tolima Department	D	1					
Peru. Junin Department	C	5					
Venezuela. Bolivar State	C	1					

[1] Suspected.
[2] On Apr. 4, 1942, 1 death from suspected yellow fever was reported in Libenge, Belgian Congo.
[3] Includes 1 suspected case.
[4] Includes 4 suspected cases.
[5] According to information dated Feb. 9, 1942, 15 deaths from yellow fever among Europeans have occurred in Senegal.
[6] Includes 5 suspected cases.
[7] All yellow fever in South America is of the jungle type unless otherwise specified.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

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THE STORY OF THE NATIONAL LEPROSARIUM (U. S. MARINE HOSPITAL), CARVILLE, LOUISIANA

By G. H. FAGET, *Surgeon (Medical Officer in Charge), United States Public Health Service*

INTRODUCTION

Leprosy is one of the oldest diseases of the human race, its origin lost in antiquity. Yet for centuries it has been one of the most misunderstood and dreaded diseases of mankind. Any person who became afflicted with leprosy was condemned to a hopeless life of isolation. Even to the present day an unjustified fear of leprosy lingers among the general public.

But there is no cause for this leprophobia. The fact is that leprosy is an infectious, moderately contagious disease, which is transmitted from the sick to the well in some uncertain manner. It is not so contagious as tuberculosis, yet few people fear contact with a tuberculous person. The danger of exposure to leprosy is slight and not sufficient to warrant the widespread terror of earlier times.

It is noteworthy that leprosy is most feared in countries where the disease is scarce and the danger of contagion relatively insignificant, whereas in certain tropical countries where leprosy is most prevalent and the risk of contagion greatest, it is generally regarded with indifference by the natives. This illustrates the adage that familiarity breeds contempt, for in such countries those afflicted with leprosy are seldom prevented from mingling with the public.

Although there is little danger of contracting leprosy in most civilized nations, where it is a rare disease, it must be admitted that the only sure means of eradicating leprosy from any land is segregation. Segregation today does not involve the hardships of former times. The modern leprosarium is a humane institution where every effort not inconsistent with treatment or incompatible with public safety is made to permit the leading of a normal life. Within the last generation, new approaches to the treatment of the disease have

offered a more hopeful outlook to the patients. An ever-increasing number of patients is being discharged from leprosariums as "arrested" and no longer a menace to the public.

Although leprosy is one of the oldest known diseases, it was not until 1873 that its causative agent, the "leprosy bacillus," was discovered by the Norwegian scientist, G. Armauer Hansen. Prior to that time, the disease had been confused with other conditions; now it can be identified more easily.

LEPROSY IN THE UNITED STATES

The origin and spread of leprosy in the United States is most interesting. Following its introduction from foreign lands, it generally did not spread, finding unfavorable soil in the native-born population of most localities. The State of New York is a good example of this relative immunity. Five or six cases of leprosy are encountered there annually. The Board of Health institutes a thorough investigation of each reported case. It has been found that, with possibly one or two exceptions, leprosy has never originated in New York State. Leprosy in New York and most other eastern States is an imported disease. In the majority of cases the infection has been traced to the West Indies, South America, the European nations bordering the Mediterranean, and other infected countries.

In the central and northern States only occasional cases of leprosy have been found, usually among immigrants. Minnesota, Iowa, and Wisconsin have been an exception to this rule. There leprosy was introduced by Norwegian and Swedish settlers in the middle of the 19th century. Altogether, between 160 and 200 Scandinavians afflicted with leprosy settled in these States, the largest number of them in Minnesota. Although no new cases of leprosy developed in the Scandinavian settlement during the first 50 years, seven cases occurred between 1895 and 1916, most of them in families of the imported cases. None have occurred since then, showing that although the disease spread temporarily in Minnesota and the neighboring States, it did not thrive there and soon was extinguished.

Leprosy is constantly being introduced into California and the other Pacific Coast States by Chinese immigrants, as well as by Filipinos and Hawaiians. Most of these immigrants are in the latent state of the disease upon entering the country, and leprosy may not manifest itself until years later. In the southern part of the State, the disease is introduced by Mexicans. So far, comparatively few native-born Californians have contracted leprosy in California. These number 14 or 15 cases among 194 patients admitted to the Carville leprosarium from that State.

Geographically, we recognize the Gulf Coast States as the most active focus of leprosy in the United States. Here, especially in

certain parts of Florida, Texas, and Louisiana, leprosy has become a public health problem.

The origin of leprosy in Florida can be traced to the early Spanish settlers and their imported African slaves. Romans's history of Florida, written in 1776, describes the existence of leprosy among the Negroes of that State. Since then, the disease has, no doubt, also been imported from Cuba and other islands of the West Indies. In certain parts of Florida, leprosy has become endemic and is being slowly transmitted from one generation to the next.

In Texas, leprosy has established a foothold, mostly along the Rio Grande. The early cases in this State came from Mexico, but today the disease is communicable on Texas soil. The records of the United States Marine Hospital at Carville indicate that 192 cases of leprosy were admitted from Texas and that there were 138 natives of that State admitted, most of whom were infected in Texas.

Today there is a greater incidence of leprosy per population in Louisiana than in any other State of the Union. Two possible sources of leprosy in Louisiana were considered by that eminent student of leprosy, Isadore Dyer. These were: importation from the West Indies, and origination among the Acadians, who came from Canada between 1756 and 1760. The former is the more probable source of the two.

THE LOUISIANA LEPER HOME

Although leprosy continued to spread in southern Louisiana, particularly among the Acadian descendants, it was not until 1894 that any constructive action was taken against the disease. In that year the State legislature passed an act creating a Board of Control, whose function was to provide a home for sufferers of leprosy. By the end of the year a temporary site had been leased for 5 years in Iberville Parish. This was the old Indian Camp plantation, about 80 miles up the Mississippi River from New Orleans.

On November 30, 1894, eight patients were transported from New Orleans by night on a coal barge towed by a tug. The next morning they arrived at their new home. About a year after the opening of the home, the Board of Control, realizing that the patients were not receiving sufficient attention, requested the Sisters of Charity to care for them. A contract was drawn up between the Community of Sisters and the State of Louisiana, whereby the Sisters assumed the gratuitous domestic charge and nursing care of the patients. Four Sisters volunteered their services and came to stay with the patients. The Sisters took up residence in the old colonial home of the abandoned plantation, while the patients were housed in the old slave cabins. This was a temporary arrangement while a site more convenient for administrative purposes was being sought nearer New Orleans.

In 1900 the State legislature appropriated a sum of money sufficient for the purchase of such a site and the building of a leprosarium. Unfortunately, misguided neighbors were so strongly opposed to this plan that, when the transfer of the patients was proposed, they burned the buildings.

Thereafter attempts to find a new location for the leprosarium were abandoned and, instead, new cottages, housing 10 patients each, were constructed on the plantation to replace the old slave shacks. Gradually, suitable housing to accommodate comfortably a hundred patients and a new building for use as a dining room and kitchen were provided. This was the condition of the efficiently functioning Louisiana Leper Home in 1920, when the Federal Government negotiated to take it over.

Many years previously the Federal health authorities had already become aware of the necessity for more stringent measures to check the progress of leprosy in the United States. A committee of experts testified before Congress that leprosy existed in practically every State of the Union, that the disease had been present for a number of years, that it was on the increase, and that the only known means of effectively controlling it was segregation. By 1916 the information gathered through scientific investigations in previous years had been compiled· it indicated the advisability of Congressional provision for a home where all persons afflicted with leprosy might be cared for and treated.

However, not until February 3, 1917, did Congress enact legislation and provide funds for the establishment of a national leprosarium to be under the administration of the United States Public Health Service.

Because of World War I, action on this legislative measure was postponed for several years. Then a committee of Public Health Service officers was appointed to select a suitable site for the proposed leprosarium. Great difficulty was experienced in this task. No State cared to cede territory to the Government for use as a leper colony. Finally, the matter was settled by purchasing from the State of Louisiana on January 3, 1921, the property occupied by the Louisiana Leper Home.

THE NATIONAL LEPROSARIUM

The State of Louisiana then transferred the patients, hospital, and grounds to the United States Public Health Service. At a flag raising ceremony, the National Leprosarium was officially opened on February 1, 1921, with O. E. Denney as its first medical officer in charge. There were at that time 90 patients in the home. It immediately became necessary to enlarge and rehabilitate the existing buildings,

because of the expected rapid increase in population. Soon new patients were admitted from many States and the census of the institution quickly rose to 172.

On March 4, 1923, the sum of $645,000 was appropriated by an act of Congress, in order to expand further the capacity of the leprosarium. This building program was completed in 1924, when housing facilities for approximately 425 patients became available.

The act of Congress of February 3, 1917, authorizing the construction of the National Leprosarium had directed the Surgeon General of the Public Health Service to prepare rules and regulations for the type of patients to be admitted. These regulations stipulated that there should be admitted to the leprosarium:

(1) Any person afflicted with leprosy who presents himself or herself for care, detention, and treatment, or

(2) Who may be apprehended under authority of the United States Quarantine Acts, or

(3) Any person afflicted with leprosy duly consigned to said home by the proper health authorities of any State, Territory, or the District of Columbia.

Leprosy was the first disease for which the United States Government made specific regulations pertaining to the transportation of infected persons. Since 1912 the Interstate Quarantine Regulations have provided rules for the safe transport of persons who present symptoms of leprosy.

After the necessary State permits are received, patients are transferred to the leprosarium accompanied by a medical officer of the Public Health Service. A compartment is provided for the patient who is strictly isolated during the trip. All dishes and utensils are disinfected before leaving the compartment, all secretions or discharges are disinfected and properly disposed of, and the space occupied is disinfected upon being evacuated by the patient. As now practiced by the Public Health Service, the transportation of persons with leprosy is effected without exposing the public to any danger of infection.

In this country there is evidence that the greatest menace of leprosy is to the health of the other members of an afflicted person's household. The risk of contagion is considerable, especially to children, in the intimacy of the family circle. The patient should realize that the greatest boon of his segregation at a leprosarium is the protection it insures his family. The high incidence of leprosy in certain families is well demonstrated in the records of the Carville Marine Hospital and has frequently been commented upon by certain writers and experts on the subject. So the concealment of a person with leprosy by his family often strikes home again, as it may lead to the infection

of other members of the family. Concealment and transmission of leprosy within the family group seems an important cause in keeping the disease alive in this country. On the other hand, the rather feeble contagiousness of leprosy among nonrelatives is striking. At the Carville leprosarium, during the 47 years of its operation, not a single case of leprosy developed among the professional or other employees in spite of their proximity to the patients.

RECENT IMPROVEMENTS IN THE NATIONAL LEPROSARIUM

Until recently most of the buildings of the Federal leprosarium at Carville were of wooden frame structure and therefore a fire hazard. Starting in the spring of 1940, at a cost of approximately two and a half million dollars, the Government undertook to rebuild the institution almost completely, in order to make it fireproof. This building program was completed by the end of 1941. Facilities have been increased to take care of 480 ambulatory patients, in addition to the 65 hospital rooms for bed patients. At present the leprosarium at Carville can be considered the finest and most modern in the world.

The visitor who approaches the Federal leprosarium at Carville for the first time is surprised to see such imposing buildings in an otherwise rural district. After he enters the reservation of 350 acres, he is impressed by the fact that it is a self-sustaining community, resembling a small town. There is a power plant for the generation of electricity, the manufacture of ice, and the operation of a central steam-radiator heating system. A modern sand filtration plant with attached chlorinating apparatus furnishes over 200,000 gallons of potable water a day. Both hot and cold water is piped to all the buildings of the colony. The water consumption per capita is above that of most large cities in the United States. This meets with the approval of the administrative force, since cleanliness is conducive to health and the source of supply, the Mississippi River, is inexhaustible. There are two modern sanitary laundries, one for the patients, the other for the personnel. A large sanitary dairy with pasteurization and cold storage facilities produces 180 gallons of Grade A milk a day. Cattle are raised to furnish beef products. Protestant and Catholic churches and their respective resident chaplains afford the patients religious comfort. A well-equipped fire department is ready to function at all hours. The sewage system with its septic tanks and the incinerator plant for the disposal of garbage assure the complete sanitation of the community and protection of the neighboring public. An extensive drainage system demands constant attention to prevent a mosquito nuisance and a possible malaria menace. Besides the numerous buildings for the use of the patients and the large nurses'

home, there are 25 residences for doctors, administrative, clerical, mechanical, and other employees. All the personnel are employees of the Federal Government; there are no volunteer workers. Paved roads connect the different parts of the reservation.

Passing from the personnel to the colony side of the estate, the visitor comes first to the hospital where the bed patients are treated. This is a two-story concrete building containing 44 rooms for men and 21 rooms for women patients. In addition, it contains a first-class operating room, an adequate X-ray department, a dental clinic, a bacteriologic and pathologic laboratory, a physiotherapy department, dressing-room clinics for men and women, offices, and examining rooms.

The ambulatory patients, who are by far in the majority, are domiciled in 16 two-story concrete buildings. Each of these buildings contains, on each floor, 15 individual bedrooms, bathrooms, a reception room, and front and back porches. The front porches are connected upstairs and downstairs by concrete passageways, screened and covered for the protection of the patients in going about the colony.

Every effort has been made to provide the patients with the comforts of home; for the most part, they are contented and well satisfied with all that is being done for them. They can pursue their avocations and enjoy a variety of community activities. Each patient has his own room with adequate modern fireproof furniture. He may arrange and decorate his room to suit his taste Visitors are allowed, as in other hospitals. There are no restrictions in correspondence with relatives or friends except that all outgoing mail is disinfected.

On each side of the hospital is a building for occupational therapy. Each of these two-story buildings has 18 rooms. These are used as sewing room, music room, school room, photography room, barber shop, tailor shop, pressing shop, carpenter shop, shoemaker's shop, bicycle repair shop, radio repair shop, rooms for various other arts and crafts, and finally the printing offices of the patients' local paper, "The Star." This is an interesting monthly periodical, the purpose of which is "radiating the light of truth on Hansen's disease." It contains many splendid articles from the pens of patients. Its outside circulation is increasing. Occupational therapy in its different forms is a useful part of the patients' treatment. Occupation has a good moral effect upon the patient; it prevents brooding upon his malady. The employment of 98 patients on a small salary basis by the Government serves the same purpose. It also affords them ready cash for the purchase of the little luxuries not furnished by the Government. The Government provides all patients with food, clothing,

toilet articles, books, magazines, newspapers, a golf course, tennis courts, baseballs, basketballs, and other sporting equipment, and three motion-picture shows each week.

The new recreation building has filled a long-felt need at the National Leprosarium. This beautiful, spacious, two-story structure is the feature of the new construction program which has pleased the patients most. It cost approximately $140,000 and was well worth the price for the recreational facilities it affords this group of shut-in citizens from practically every State of the Union. A modern motion-picture theater, a canteen operated by patients for the benefit of the patients, smoking rooms for men and women, and a splendid library with many excellent books are on the first floor. On the top floor is a huge ball or concert room with an orchestral platform on one side. Here frequent dances are given by the patient body. Baton Rouge and New Orleans bands come to play the latest swing music.

The patients are served their meals cafeteria style at 7 a. m., noon, and 5 p. m. The dining room adjoins a clean, well-equipped kitchen. Menus are carefully planned; the food is well cooked, tasty, and nutritious. The meals served can be compared to those of a first-class hotel. Food plays a direct part in the fight against the disease and no effort is spared to provide the best.

ACTIVITIES OF THE NATIONAL LEPROSARIUM

The medical, surgical, and nursing services are qualified to cope with the disease. The nursing is in the hands of 19 Sisters of Charity, some of whom were retained by the Federal Government from the Louisiana State regime. The Sisters are graduate nurses and have always given satisfactory service. The patients appreciate their gentle manner and tender nursing care.

The medical staff consists of five medical officers, one dentist, and three consultants from New Orleans. One of the consultants, Ralph Hopkins, was visiting physician to the Louisiana Leper Home. He has been making weekly visits to the Carville institution ever since, a period of 40 years.

In addition to keeping up with all new developments in general medicine, the medical staff specializes in leprosy. The medical library is well stocked with books and medical journals dealing with the subject.

Besides general institutional care, the patients are given any special treatment which may be thought beneficial to their condition. With few exceptions all of the patients take some form of treatment. During the last year 200 patients were taking chaulmoogra oil by mouth and more than 150 were taking routine intramuscular injections of chaul-

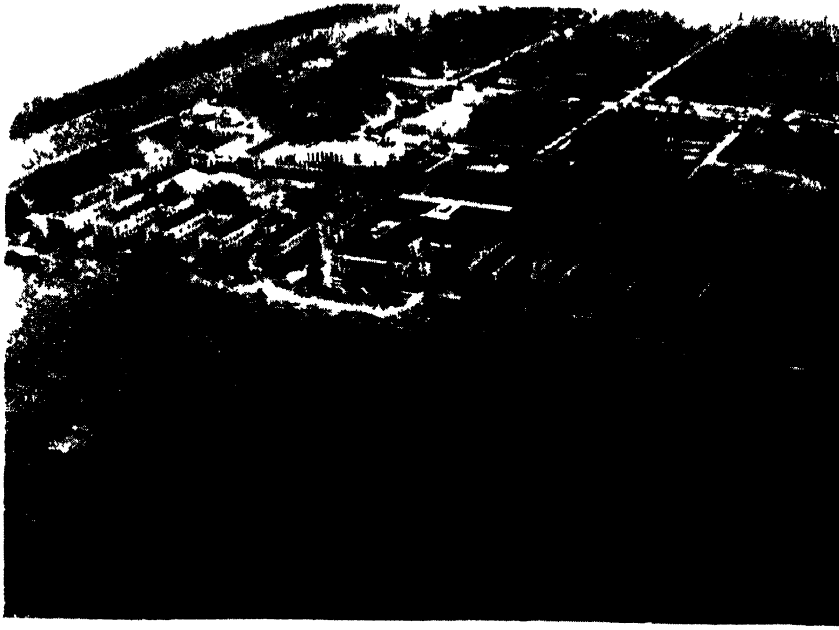

FIGURE 1.—Airplane view of the National Leprosarium, Carville, La.

FIGURE 2.—Catholic and Protestant churches, left and right.

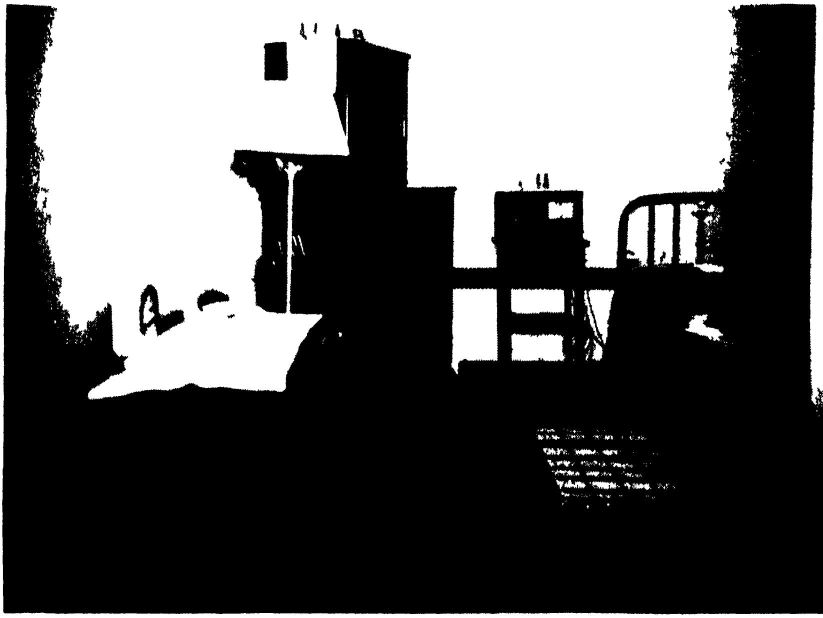

FIGURE 3.—A patient's bedroom

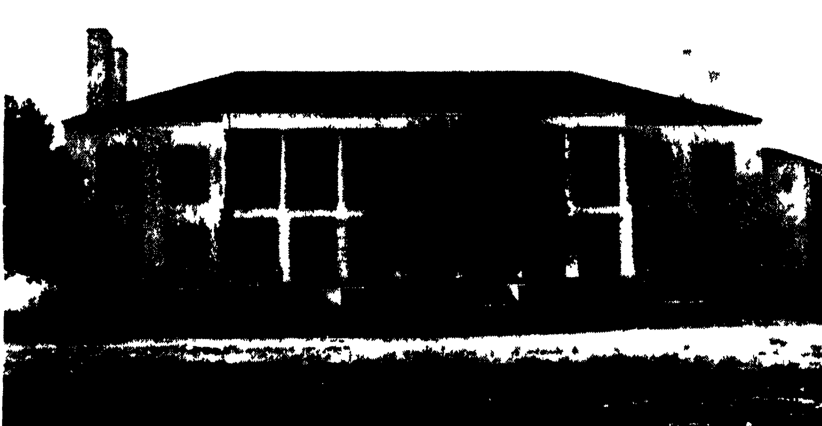

FIGURE 4.—Patients' recreation building

moogra oil with benzocaine or the ethyl esters of hydnocarpus with iodine. Although there was no further evidence of definite specific action, the impression persists that the chaulmoogra oil products are of some benefit in leprosy.

Several new experimental treatments have recently been undertaken on a number of patients. A few selected patients were given rather extensive treatment with the various sulfonamide drugs. This study is being continued with encouraging results especially in clearing up secondary infections and in healing chronic disabling ulcers. Whether some of the newer sulfonamide derivatives have therapeutic action in leprosy remains to be proved.

Vitamin therapy has been given an extensive trial. All of the vitamins have been used when necessary for their general tonic effect. Vitamin A in the form of "Alfon" was given to a small group of patients but did not seem to be as effective as had been hoped. Vitamin B_1 (thiamine chloride) in large doses was found efficacious in relieving painful leprous neuritis. Riboflavin (B_2) was used in certain leprotic eye manifestations but without definite benefit.

Diphtheria toxoid, for which such enthusiastic claims were made elsewhere, was subjected to an experimental study under carefully controlled conditions in a large group of patients. The results were disappointing.

During institutional treatment attempts are made to discover and remove any intercurrent disease which might react unfavorably upon leprosy. The eye, ear, nose, and throat complications of leprosy are frequent and require energetic treatment. A full-time specialist devotes all of his time to this work. He is able to give relief to the patients and prevent some disabling conditions from developing.

The physiotherapy department is a busy service; approximately 15,000 treatments are given yearly in electrotherapy, thermotherapy, hydrotherapy, and massage. These various forms of physiotherapy are found useful is relieving nerve pains, restoring muscular functions, and healing ulcerations.

In the dental clinic, a dentist and his assistant keep the patients' mouths and teeth in hygienic condition. This helps them in regaining their health.

The laboratory is equipped for scientific research into the various phases of leprosy. In connection with it there is a well-kept animal house for guinea pigs, rabbits, mice, rats, opposums, and Syrian hamsters, which are used for experimental purposes. Attempts at the reproduction of leprosy in these various laboratory animals are being continued. A full-time bacteriologist conducts these research experiments.

The dermatologic, orthopedic, and neuropsychiatric clinics are well attended. They supplement the other medical activities of the hospital and afford the patient expert professional advice in these specialties.

The Carville Marine Hospital, being the only leprosarium in the United States, serves as a center for the dissemination of knowledge on the subject of leprosy. Numerous letters of inquiry are received and answered annually.

The institution is also used as a postgraduate instructional center on leprosy. During the past year, 124 doctors, 6 dentists, and 90 nurses visited the station, seeking clinical information on the disease. Some of the visiting physicians came from distant States and several foreign countries. The American Dermatological Association, which held its annual convention in New Orleans last year, devoted part of one day of its program to a conference on leprosy at the Marine Hospital in Carville. The postgraduate class in tropical medicine of Tulane University attended a clinical demonstration on leprosy at Carville. Members of the medical staff of the Carville leprosarium went to New Orleans to lecture to these doctors on different aspects of the disease. Every year leprosy clinics are given to the senior medical students of Louisiana State University and of Tulane University, and to the senior dental students of Loyola University, all of New Orleans. It is felt that this practical experience will aid these doctors in the earlier diagnosis of leprosy in their future medical careers.

STATISTICAL DATA

During the period of State control, 338 patients were admitted, all but 16 of them from Louisiana. Ninety of these patients were in the State hospital on February 1, 1921, when the Federal Government took charge, and were transferred to the National Leprosarium. From February 1, 1921, to January 1, 1942, 1,034 patients were admitted, making a total of 1,371 admissions since December 1, 1894. Of this number, 593 have died at the hospital, 53 have been deported to foreign countries, and 309 have been discharged as arrested and no longer a menace to public health. Fifty-eight of these have relapsed and returned to the hospital for further treatment.

Of the total admissions, 404 were foreign born, the largest number (148) coming from Mexico. All patients, of course, were in the United States when their disease was discovered. Among the States from which patients were admitted Louisiana leads with 576, California follows with 194, Texas is third with 192, New York fourth with 118, and Florida fifth with 76. All other States have sent a total of 215. Patients have been received from 40 States, the District of Columbia, Philippine Islands, Hawaii, and the Canal Zone.

Table 1 shows the nativity of patients admitted during the past 10 years.

TABLE 1.—*Nativity of patients*

Nativity	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941
United States	30	25	38	31	17	23	26	26	41	29
Insular possessions	11	8	2	3	2	3	1	3	6	1
Other countries	16	13	15	20	7	14	11	14	15	12
Total	57	46	55	54	26	40	38	43	62	42

In table 2 is given the number of men and women in the hospital at the end of each year during the past 10 years.

TABLE 2.—*Number of patients in hospital*

Male	262	259	258	269	247	258	239	248	246	249
Female	101	96	96	102	113	113	113	116	131	123
Total	363	355	354	371	360	371	352	364	377	372

Admissions for the year 1941, with State of origin and place of nativity of each patient, are shown in table 3.

TABLE 3

State of origin		*Place of nativity*	
Louisiana	12	Louisiana	10
California	11	Texas	9
Texas	11	California	4
New York	2	Pennsylvania	1
Florida	2	New York	1
Illinois	1	Florida	1
Wyoming	1	North Carolina	1
Washington	1	Oregon	1
Rhode Island	1	Ohio	1
		Philippine Islands	1
Total	42	Mexico	9
		China	2
		British West Indies	1
		Total	42

Table 4 gives, for the past 10 years, the number of patients discharged as "arrested" and no longer a menace to public health.

TABLE 4.—*Patients discharged from leprosarium*

Discharged as "arrested"	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941
Male	17	12	9	5	12	13	14	12	6	7
Female	12	8	8	3	2	9	6	5	1	8
Total	29	20	17	8	14	22	20	17	7	15

CONCLUSIONS

At present the Carville leprosarium is fully equipped for properly dealing with the disease. There is an increasing local interest in the welfare of the patients. Achievements in treatment are growing more important each year and discharges of "arrested" cases show a corresponding increase. It is felt that there is need for a more general education of the public in order that the unwarranted popular fear of leprosy may be replaced by a more enlightened attitude. In addition, a better education of persons afflicted with leprosy and their families is also necessary in order that more patients may seek voluntary admission during the early stages of the disease. They should realize that earlier institutional care and treatment will give them a better chance of arresting the disease. This is the goal toward which we strive.

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ANAPHYLAXIS IN GUINEA PIGS FOLLOWING SENSITIZATION WITH CHICK-EMBRYO YELLOW FEVER VACCINE AND NORMAL CHICK EMBRYOS [1]

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The increasing use of virus and rickettsial vaccines prepared from infected chick embryo or chick embryonic tissues, and the probability of repeated injections of these products into human beings, make it desirable to obtain experimental evidence concerning the possibility of unfavorable reactions following vaccinations with these materials.

Chick-embryo vaccines have been used successfully on a large scale for the immunization of man against the virus of yellow fever, and of

[1] Contribution from the Rocky Mountain Laboratory of the Division of Infectious Diseases, National Institute of Health.

horses and mules for protection against both the eastern and western strains of equine encephalomyelitis virus. To a lesser degree, human beings have been vaccinated against equine encephalomyelitis and influenza with chick-embryo propagated virus. Rickettsial cultures in yolk membrane have been employed in the preparation of vaccines against Rocky Mountain spotted fever, typhus fever, and American "Q" fever. Other vaccines of a similar nature are being gradually added to the list.

The widest application of a chick-embryo vaccine has been made in the field of yellow fever prophylaxis. Over 2,000,000 individuals have been vaccinated by the Rockefeller Foundation at least once, and many thousands twice. No unfavorable reactions attributable to sensitization have been reported.

Vaccination of human beings with chick-embryo preparations against equine encephalomyelitis has been reported on a more limited scale (*1*, *2*, *3*, *4*). Two injections are given at a 7-day interval, each dose being considerably larger (2.0 ml. of undiluted vaccine) than the single dose (0.5 ml. of 1:10 dilution) given for yellow fever immunization. The immunity produced with formolized equine encephalomyelitis virus appears to be of much shorter duration than that acquired following vaccination with the living yellow fever vaccine virus, so that revaccination may be required from time to time. Beard, Finkelstein, and Beard (*3*) note that little reaction was observed in persons vaccinated for the first time, yet each of a small series of individuals given a dose of 2.0 ml. in a second course of injections showed a definite general reaction.

Accumulating data concerning results of vaccination of animals against equine encephalomyelitis demonstrate clearly the danger of anaphylactic phenomena following a second series of injections. Graham (*5*), Schoening (*6*), and Wolfe and Trum (*7*) report severe or fatal cases of anaphylaxis under these conditions. Wolfe and Trum also observed apparently typical desensitization in animals following recovery from anaphylactic shock.

Van der Scheer, Wyckoff, and Bohnel (*4*) have demonstrated that guinea pigs can be sensitized readily and subsequently brought into a condition of fatal anaphylactic shock with relatively small doses of chick-embryo equine encephalomyelitis vaccine. On the other hand, Rocky Mountain spotted fever vaccine prepared from diseased yolk sac tissue according to Cox's method (*8*, *9*) failed to induce sensitization when doses of comparable nitrogen content were employed. These results have been confirmed by Cox (*10*), using yolk-membrane typhus vaccine in even larger doses than those given by the foregoing workers.

Incident to the manufacture of entire-embryo yellow fever vaccine, the question arose as to possible changes which might occur in antigenic specificity of chick-embryo protein at different stages of development. For the experimental work here reported, there was available a range of vaccines varying with the age of embryos employed in their manufacture. Age of embryos as measured by period of incubation, ranged from 10 to 14 days. The finished vaccines were diluted with normal inactivated human serum, with distilled water, or prepared without diluent.

In general, the method of preparation of these vaccines was similar in all essentials. Eggs were incubated for 7 to 11 days and the living embryos inoculated with the 17-D strain of attenuated yellow fever virus developed by Theiler and Smith (*11, 12*). After an additional incubation for 3 days, the still living embryos were removed aseptically from the shells and ground to a fine pulp in blenders cooled with dry ice. If a diluent was to be used, either normal human serum or distilled water [2] was added, or, in the case of 100 percent embryo vaccines, no diluting fluid was employed. These preparations were then centrifuged in an angle centrifuge at from 3,500 to 3,700 r. p. m. for 30 to 60 minutes to remove tissue debris. The supernatant extract, constituting the finished vaccine, was dispensed in ampules, frozen in a dry ice-alcohol mixture, and stored at minus 23° C.

TABLE 1.—*Antigens employed*

1	Yellow fever vaccine YF 4	10-day embryo, 29 percent in human serum
2	Yellow fever vaccine YF 25	10-day embryo, 30 percent in human serum
3	Yellow fever vaccine YF 41	10-day embryo, 21 percent in human serum
4	Yellow fever vaccine YF 15	10-day embryo, 100 percent
5	Yellow fever vaccine YF 16	10 day embryo, 100 percent
6	Yellow fever vaccine YF 47	10-day embryo, 100 percent.
7	Yellow fever vaccine YF 22	10-day embryo, 75 percent in distilled water.
8	Yellow fever vaccine YF 9	10-day embryo, 57 percent in distilled water.
9.	Normal 10 day embryo extract, 75 percent in distilled water	
10	Yellow fever vaccine YF 13	11-day embryo, 72 percent in distilled water.
11	Normal 11-day embryo extract, 75 percent in distilled water	
12	Yellow fever vaccine YF 20	12-day embryo, 75 percent in distilled water
13	Yellow fever vaccine YF 28	12-day embryo, 75 percent in distilled water
14	Yellow fever vaccine YF 10	12 day embryo, 56 percent in distilled water
15	Normal 12 day embryo extract, 75 percent in distilled water	
16	Yellow fever vaccine YF 38	13-day embryo, 100 percent
17	Yellow fever vaccine YF 27	13-day embryo, 75 percent in distilled water.
18	Yellow fever vaccine YF 34	13-day embryo, 75 percent in distilled water.
19	Normal 13-day embryo extract, 75 percent in distilled water	
20	Yellow fever vaccine YF 18	14-day embryo, 100 percent
21	Yellow fever vaccine YF 19	14-day embryo, 75 percent in distilled water.
22	Yellow fever vaccine YF 26:	14-day embryo, 75 percent in distilled water.
23.	Normal 14-day embryo extract, 75 percent in distilled water.	

As antigenic materials, 18 yellow fever vaccines and 5 normal whole chick-embryo extracts were employed. The composition is shown in table 1. The normal whole embryo extract was prepared in a manner similar to that for the aqueous base yellow fever vaccines except that the embryos were not inoculated with virus.

[2] The term "aqueous base vaccine" is employed hereafter to designate all vaccine prepared without addition of human serum.

In order to eliminate the possibility of toxic reactions to the various antigenic preparations employed, 3 nonsensitized guinea pigs were given intracardial injections, in 0.2 ml. doses, of one vaccine from each of the groups employed and of each normal embryo extract. A single animal showed an immediate collapse following the injection but recovered quickly and completely. None of the ther animals showed any indication of an unfavorable reaction although they were observed closely for toxic symptoms. The results are given in table 2.

Guinea pigs weighing from 250 to 300 grams were given a single sensitizing dose of 0.05, 0.1, or 0.2 ml. of the various antigenic preparations by the subcutaneous route. The smallest dose employed has been shown to be sufficient for sensitization of guinea pigs with entire chick-embryo vaccine of the equine encephalomyelitis type *(4)*. After an interval of 21 to 23 days, a challenging dose of 0.1 or 0.2 ml. of the same preparation as that used for sensitization was injected intracardially and the animals observed closely for anaphylactic reactions. A minimum of four guinea pigs were given sensitizing doses for each antigen employed, but several died from intercurrent infections before they could be tested. Only animals which were given both the sensitizing and challenging doses are listed.

TABLE 2.—*Results of toxicity experiments with chick-embryo yellow fever vaccine and normal chick-embryo extract*

Guinea Pig No	Test material	Test dose, ml (intracardial)	Reaction
	Y F Vaccine Lot No		
1	Y F 25	0 2	None
2	Y F 25	0 2	Do
3	Y F 25	0 2	Do
4	Y F 9	0 2	Do
5	Y F 9	0 2	Do
6	Y F 9	0 2	Do
7	Y F 13	0 2	Do
8	Y F 13	0 2	Do
9	Y F 13	0 2	Immediate collapse, recovery
10	Y F 20	0 2	None.
11	Y F 20	0 2	Do
12	Y F 20	0 2	Do
13	Y F 38	0 2	Do.
14	Y F 38	0 2	Do
15	Y F 38	0 2	Do
16	Y F 19	0 2	Do
17	Y F 19	0 2	Do.
18	Y F 19	0 2	Do
	Normal embryo		
19	10-day	0 2	Do.
20	do	0 2	Do
21	do	0 2	Do.
22	11-day	0 2	Do
23	do	0 2	Do.
24	do	0 2	Do.
25	12-day	0 2	Do
26	do	0 2	Do
27	do	0 2	Do
28	13-day	0.2	Do.
29	do	0 2	Do.
30	do	0 2	Do.
31	14-day	0.2	Do.
32	do	0 2	Do.
33	do	0 2	Do.

Three experiments were carried out employing chick-embryo yellow fever vaccines, and two with normal (noninfected) chick-embryo extracts. Since the trend of the results obtained in the several series was essentially the same, the data for all experiments are combined in tables 3 and 4. Embryo preparations or vaccines manufactured from chick-embryo tissue of the same age are grouped together for convenience.

TABLE 3.—*Results of sensitization experiments with yellow fever chick-embryo*

Guinea pig No	Yellow fever vaccine	Period of sensitization (days)	Sensitizing dose, ml. (subcutaneous)	Challenging dose, ml. (intracardial)	Reaction
HUMAN SERUM BASE (CONTROL) VACCINES					
34	YF 4	23	0.05	0.10	None.
35	YF 4	23	.05	.20	Death 3 minutes.
36	YF 4	23	.20	10	Death 4 minutes.
37	YF 4	23	20	.20	Severe
38	YF 25	21	.05	.10	Death 4 minutes.
39	YF 25	21	05	.20	Do
40	YF 25	21	.20	.10	Death 5 minutes.
41	YF 25	21	.20	.20	Moderate
42	YF 41	22	.10	.10	Mild.
43	YF 41	22	20	.10	Death 8 minutes.
44	YF 41	22	.10	.20	Death 3 minutes.
45	YF 41	22	20	.20	Severe
10-DAY EMBRYO AQUEOUS BASE VACCINES					
46	YF 15	21	0.05	0.10	None
47	YF 15	21	.05	.20	Do.
48	YF 15	21	20	10	Do
49	YF 15	21	.20	20	Do
50	YF 16	23	05	.10	Do
51	YF 16	23	05	20	Do
52	YF 16	23	20	.10	Do
53	YF 16	23	20	.20	Do
54	YF 22	21	.05	.10	Do.
55	YF 22	21	.05	20	Do
56	YF 22	21	20	.10	Moderate.
57	YF 22	21	20	.20	Severe
58	YF 9	22	10	10	None
59	YF 9	22	20	10	Mild
60	YF 9	22	.20	.20	None
61	YF 9	22	10	.20	Do
62	YF 47	22	.10	.10	Do.
63	YF 47	22	20	.10	Do.
64	YF 47	22	10	.20	Do.
65	YF 47	22	.20	.20	Mild.
11-DAY EMBRYO AQUEOUS BASE VACCINES					
66	YF 13	21	0.05	0.10	None
67	YF 13	21	05	.20	Do.
68	YF 13	21	.20	.10	Do.
69	YF 13	21	.20	.20	Do.
70	YF 13	22	.10	.10	Death 12 minutes.
71	YF 13	22	.20	.10	Severe.
72	YF 13	22	.10	.20	None.
73	YF 13	22	.20	.20	Do.

TABLE 3.—*Results of sensitization experiments with yellow fever chick-embryo vaccines*—Continued

Guinea pig No.	Yellow fever vaccine	Period of sensitization (days)	Sensitizing dose ml (subcutaneous)	Challenging dose ml (intracardial)	Reaction
12-DAY EMBRYO AQUEOUS BASE VACCINES					
74	YF 10	23	0.05	0.10	None
75	YF 10	23	.05	.20	Do
76	YF 10	23	.20	.10	Do
77	YF 10	23	.20	.20	Do
78	YF 20	21	.05	.10	Do
79	YF 20	21	0	.20	Do
80	YF 20	21	.20	.10	Death 5 minutes
81	YF 20	21	.20	.20	Mild
82	YF 20	22	.10	.10	Do
83	YF 20	22	.20	.10	Death 4 minutes
84	YF 20	22	.10	.20	Mild
85	YF 20	22	.20	.20	Severe
86	YF 28	21	0	.10	None
87	YF 28	21	.05	.20	Do
88	YF 28	21	.20	.10	Do
89	YF 28	21	.20	.20	Do
13-DAY EMBRYO AQUEOUS BASE VACCINES					
90	YF 27	21	0.05	0.10	None
91	YF 27	21	.05	.20	Do
92	YF 27	21	.20	.10	Do
93	YF 27	21	.20	.20	Do
94	YF 34	22	.10	.10	Severe
95	YF 34	22	.20	.10	Do
96	YF 34	22	.10	.20	Do
97	YF 34	22	.20	.20	Do
98	YF 38	21	.05	.10	None
99	YF 38	21	.05	.20	Death 5 minutes
100	YF 38	21	.20	.20	Do
14-DAY EMBRYO AQUEOUS BASE VACCINES					
101	YF 18	21	0.05	0.10	None
102	YF 18	21	.05	.20	Severe
103	YF 18	2	.20	.10	None
104	YF 18	21	.20	.20	Death 3 minutes
105	YF 18	23	0	.10	Do
106	YF 18	23	.05	.20	Do
107	YF 18	23	.20	.10	Do
108	YF 18	23	.20	.20	Death 5 minutes
109	YF 19	21	.05	.10	Death 4 minutes
110	YF 19	21	.05	.20	None
111	YF 19	21	.20	.10	Do
112	YF 19	21	.20	.20	Mild
113	YF 19	22	.10	.10	Severe
114	YF 19	22	.20	.10	Mild
115	YF 19	22	.10	.20	Death 4 minutes
116	YF 19	22	.20	.20	Do
117	YF 26	21	.05	.10	None
118	YF 26	21	.05	.20	Mild
119	YF 26	21	.20	.10	Severe
120	YF 26	21	.20	.20	Death 4 minutes

TABLE 4.—*Results of sensitization experiments with normal chick-embryo extracts*

Guinea pig No.	Period of sensitization (days)	Sensitizing dose ml. (subcutaneous)	Challenging dose ml. (intracardial)	Reaction
10-DAY EXTRACT 75 PERCENT EMBRYO IN DISTILLED WATER				
121	21	0.05	0.10	None
122	21	.05	.20	Do.
123	21	.20	.20	Do.
124	22	.10	.10	Do.
125	22	.20	.10	Do.
126	22	.10	.20	Do.
127	22	.20	.20	Do.
11-DAY EXTRACT 75 PERCENT EMBRYO IN DISTILLED WATER				
128	22	0.10	0.10	None
129	22	.20	.10	Do.
130	22	.10	.20	Do.
131	22	.20	.20	Do.
132	21	.05	.10	Do.
133	21	.05	.20	Do.
134	21	.20	.10	Mild
135	21	.20	.20	None
12-DAY EXTRACT 75 PERCENT EMBRYO IN DISTILLED WATER				
136	21	0.05	0.10	None
137	21	.05	.20	Do.
138	21	.20	.10	Do.
139	21	.20	.20	Do.
140	22	.10	.10	Death 7 minutes
141	22	.20	.10	Mild
142	22	.10	.20	Do.
143	22	.20	.20	None
13-DAY EXTRACT 75 PERCENT EMBRYO IN DISTILLED WATER				
144	21	0.05	0.10	None
145	21	.05	.20	Do.
146	21	.20	.10	Do.
147	21	.20	.20	Do.
148	22	.10	.10	Do.
149	22	.20	.10	Do.
150	22	.10	.20	Death 6 minutes
151	22	.20	.20	Severe
14-DAY EXTRACT 75 PERCENT EMBRYO IN DISTILLED WATER				
152	21	0.05	0.10	Mild
153	21	.05	.20	Death 4 minutes
154	21	.20	.10	Moderate
155	22	.10	.10	Mild
156	22	.20	.10	Death 4 minutes
157	22	.10	.20	Moderate
158	22	.20	.20	Death 4 minutes

Since the results obtained with the aqueous base yellow fever vaccines and with normal chick-embryo extracts are so similar, there is little possibility that the yellow fever virus was influential in producing the reactions noted. Theiler (*19*) has shown that guinea pigs are not susceptible to intraperitoneal inoculations of yellow fever virus. Therefore, we feel justified in summarizing in table 5 the data for all preceding experiments.

TABLE 5.—*Summary Results of sensitization experiments with yellow fever chick-embryo vaccines and normal chick-embryo extracts*

Test antigen	Number of animals sensitized	Number of animals reacting	Mild reactions (percent)	Moderate reactions (percent)	Severe reactions (percent)	Deaths (percent)	Total reactions (percent)
Vaccine in human serum	12	11	8 3	8 3	16 7	58 3	91 6
10 day embryo	27	4	7 4	3 7	3 7	0	14 8
11-day embryo	16	3	6 2	0	6 2	6 2	18 7
12-day embryo	24	9	20 8	0	4 1	12 5	37 5
13-day embryo	19	8	0	0	26 3	15 8	42 1
14 day embryo	27	22	18 5	7 4	11 1	44 4	81 5

As can be seen from the data presented in table 5, 11 of 12 (91.6 percent) of the guinea pigs tested with the "positive control" 10-day embryo vaccines containing human serum showed anaphylactic manifestations upon administration of the challenging doses. Approximately 64 percent of these reactions were fatal.

Of the animals sensitized with normal chick-embryo extracts and yellow fever vaccines prepared from 10-day embryos without human serum, only 14 8 percent showed anaphylactic reactions, none of which were fatal, when the shocking dose was given.

As the age of the embryos employed in preparing the normal embryo extracts and aqueous base vaccines increased from 10 to 14 days, anaphylactic reactions also increased: 10-day embryos, 14.8 percent; 11-day embryos, 18 7 percent; 12-day embryos, 37.5 percent; 13-day embryos, 42.1 percent; and 14-day embryos, 81.5 percent. The severity of the reactions as measured by typical anaphylactic deaths also increased regularly.

Because of the striking differences obtained in reactions of animals sensitized and challenged with older embryo preparations as compared with those receiving younger embryo extracts, it was deemed advisable to repeat the experiments outlined above, making all doses comparable on a basis of nitrogen content.

A large lot of eggs from a single source was incubated in the usual manner. Living embryos were removed aseptically at the end of 8, 9 10, 11, 12, 13, and 14 days of incubation. To the embryos was

added an equal weight of sterile distilled water and a fine emulsion produced by grinding in blenders. This material was then centrifuged as in the preparation of antigenic emulsions previously employed. No attempt was made to wash the embryos free from egg albumen or other protein constituents, since it was felt that the material should be prepared in a manner essentially identical to that employed for the manufacture of chick-embryo vaccine.

The embryo extracts were analyzed for total nitrogen content by the Kjeldahl method. Average results of duplicate determinations are listed in table 6.

TABLE 6.—*Milligrams nitrogen per milliliter 50 percent embryo extract*

Embryo extract	Mg. N per Ml.	Embryo extract	Mg. N per Ml.
8-day	1.65	12-day	3.29
9-day	2.57	13-day	3.62
10-day	2.91	14-day	3.64
11-day	3.22		

Guinea pigs weighing between 250 and 285 grams were given single, subcutaneous sensitizing injections of embryo extracts in amounts equivalent in nitrogen content to that contained in 0.1 ml. human serum (1.08 mg. N). Bacteriological sterility of the extracts had been established previously. Each antigen was inoculated into 6 animals. With the particular preparations employed, it was found that intracardial injections into nonsensitized guinea pigs in volume greater than about 0.5 ml. caused immediate cardiovascular collapse. Smaller doses were without ill effect. Therefore, after a 22-day sensitization period (*13*), 4 animals in each group were given challenging injections, by the intracardial route, of doses comparable to only 0.05 ml. human serum. Volumes ranged from 0.33 ml. of the 8-day embryo extract to 0.15 ml. of the 13- and 14-day preparations. While it was recognized that such doses were smaller than those usually employed (*13*), it was our opinion that any qualitative differences between the antigenic preparations used would be emphasized by these doses. Table 7 shows the reactions obtained.

As was the case in earlier experiments, a significantly greater number of typical, violent anaphylactic manifestations were encountered in guinea pigs sensitized and shocked with embryo extracts of 12-, 13-, and 14-day chick embryos than in animals tested with younger embryo preparations.

The percentage of anaphylactic reactions following intracardial injection of challenging doses of chick-embryo antigens employed in the reported experiments are shown graphically in figure 1. Results are not included for 8- and 9-day embryo extracts since too few animals were tested with this age embryo to permit generalization on a percentage basis.

TABLE 7.—*Results of sensitization experiment with normal chick-embryo extracts*

Guinea pig No.	Test antigen embryo extract	Sensitizing dose		Challenging dose		Reaction
		ml	*mg N*	*ml*	*mg N*	
159	8 day		0	0.33	(0.55)	None
160	8 day		0	.33	(.55)	Do
161	8 day	0.65	(1.07)	.33	(.55)	Do
162	8 day	.65	(1.07)	.33	(.55)	Immediate collapse. Embolism( )
163	8 day	.65	(1.07)	.33	(.55)	None
164	8 day	.65	(1.07)	.33	(.55)	Do
165	9 day		0	.21	(.54)	Do
166	9 day		0	.21	(.54)	Do
167	9 day	.42	(1.08)	.21	(.54)	Mild
168	9 day	.42	(1.08)	.21	(.54)	None
169	9 day	.42	(1.08)	.21	(.54)	Do
170	9-day	.42	(1.08)	.21	(.54)	Do
171	10-day		0	.19	(.55)	Do
172	10 day		0	.19	(.55)	Do
173	10 day	.37	(1.08)	.19	(.55)	Do
174	10 day	.37	(1.08)	.19	(.55)	Do
175	10 day	.37	(1.08)	.19	(.55)	Do
176	10-day	.37	(1.08)	.19	(.55)	Mild
177	11 day		0	.17	(.55)	None
178	11 day		0	.17	(.55)	Do
179	11 day	.34	(1.10)	.17	(.55)	Do
180	11 day	.34	(1.10)	.17	(.55)	Do
181	11 day	.34	(1.10)	.17	(.55)	Do
182	12 day		0	.17	(.56)	Do
183	12-day		0	.17	(.56)	Do
184	12 day	.33	(1.09)	.17	(.56)	Do
185	12 day	.33	(1.09)	.17	(.56)	Mild
186	12 day	.33	(1.09)	.17	(.56)	Death 4 minutes.
187	12 day	.33	(1.09)	.17	(.56)	Death 5 minutes
188	13 day		0	.15	(.54)	None
189	13 day		0	.15	(.54)	Do
190	13 day	.30	(1.09)	.15	(.54)	Death 5 minutes.
191	13 day	.30	(1.09)	.15	(.54)	Mild
192	13 day	.30	(1.09)	.15	(.54)	Death 3 minutes
193	13 day	.30	(1.09)	.15	(.54)	Moderate
194	14 day		0	.15	(.55)	None
195	14 day		0	.15	(.55)	Do
196	14 day	.30	(1.09)	.15	(.55)	Death 4 minutes
197	14 day	.30	(1.09)	.15	(.55)	Death 3 minutes
198	14 day	.30	(1.09)	.15	([illegible])	Death 4 minutes
199	14 day	.30	(1.09)	.15	([illegible])	Death 3 minutes

Confirmatory evidence of qualitative differences in antigenicity between the older and younger embryo extracts employed was also demonstrated in another manner. The two guinea pigs remaining in each group sensitized with the various antigenic emulsions (only one survived in the 11-day group) received intraperitoneal doses of the same embryo extracts as those used in sensitization, comparable in nitrogen to 1 ml. human serum. As controls one nonsensitized guinea pig was inoculated in each group with the same volume of embryo extract as that received by the sensitized animals. In order to measure degree of reaction to the challenging doses, rectal temperatures were taken immediately before injections were given, and again at 20-minute intervals over a total period of 80 minutes. The general appearance of the animals was noted throughout the period of observation.

The results obtained again demonstrate sharp differences in response of animals to challenging doses of older and younger chick-embryo extracts (table 8, figure 2). Little or no reaction was observed in guinea pigs sensitized and challenged with 8- and 9-day embryo extract, while severe reactions were indicated both by marked fall in temperature and by extreme weakness or death in animals sensitized

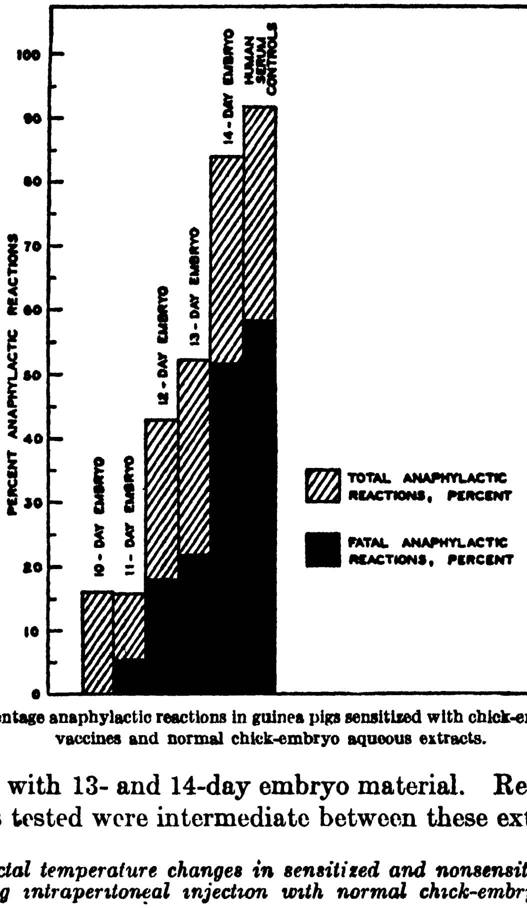


FIGURE 1.—Percentage anaphylactic reactions in guinea pigs sensitized with chick-embryo yellow fever vaccines and normal chick-embryo aqueous extracts.

and shocked with 13- and 14-day embryo material. Reactions in the other groups tested were intermediate between these extremes.

TABLE 8.—*Rectal temperature changes in sensitized and nonsensitized guinea pigs following intraperitoneal injection with normal chick-embryo extract*

Guinea pig No.	Antigen, embryo extract	Sensitizing dose, mg N.	Challenging dose, mg N.	Rectal temperature, C.					Appearance
				0 min.	20 min.	40 min.	60 min.	80 min.	
200	8-day	0	10 7	39.5	39.1	39 5	39 3	39.4	Normal.
201	8-day	1 07	10 7	40 1	40 2	40 1	40 0	40 0	Do.
202	8-day	1.07	10 7	39 0	38.7	39.1	38.6	38.8	Do.
203	9-day	0	10.8	39 6	39 4	39 6	39 3	39.5	Do.
204	9-day	1 08	10 8	39 1	38.2	38.3	37.8	38.0	Do.
205	9-day	1.08	10 8	39.6	39 0	39 5	39 4	40 0	Do.
206	10-day	0	10 8	39 3	39 3	39 5	39.5	39 5	Do.
207	10-day	1 08	10 8	39 7	39.2	39.3	39 2	38.3	Slightly weak.
208	10-day	1 08	10 8	39.4	38.4	38.1	37 3	37.4	Normal.
209	11-day	0	11 0	39 8	39 3	39.9	39 8	40.1	Normal.
210	11-day	1 10	11 0	39.6	38 4	38.4	38.3	38.5	Slightly weak.
211	12-day	0	10 9	39 9	39 4	39 8	39.9	40 0	Normal.
212	12-day	1 09	10 9	39 0	37.7	37 0	36 5	36.7	Extremely weak.
213	12-day	1 09	10 9	39 7	38 6	38 5	38.4	38.4	Huddled; slightly weak.
214	13-day	0	10 9	39.5	38.6	37 8	38.7	39.2	Normal.
215	13-day	1 09	10.9	40.0	38.8	37.8	36.8	35.9	Extremely weak.
216	13-day	1 09	10.9	39.1	38.0	(1)	--------	--------	
217	14-day	0	10 9	39 5	38.4	39.5	39.5	39.6	Normal.
218	14-day	1.09	10 9	39.6	38.1	37.3	36.5	35.4	Extremely weak.
219	14-day	1 09	10.9	40.0	38.7	37.6	(2)	--------	

1 Death 25 minutes; final temperature 37.7°C.
2 Death 50 minutes, final temperature 36.2°C.

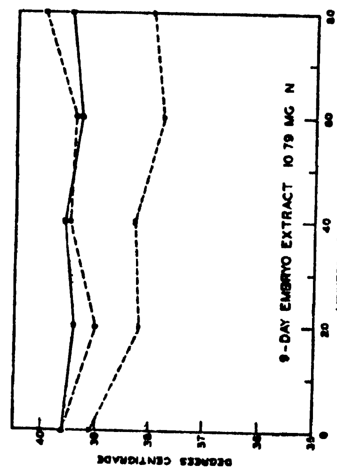
In most instances an initial fall in temperature was noted in control animals as well as in sensitized animals following inoculation. However, in all cases these temperatures approached or rose above their previous levels. Guinea pigs which survived the 80-minute period of observation were still living at the end of 2 hours, at which time they were discarded.

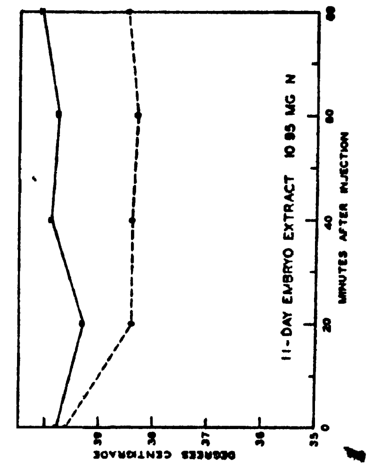
DISCUSSION

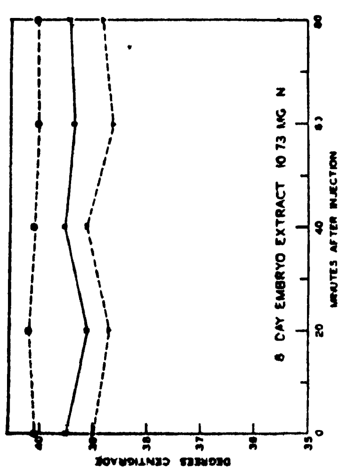
Analysis of the results obtained indicate an increased probability of reactions of an anaphylactic nature in individuals who receive multiple doses of unrefined chick-embryo vaccines prepared from embryos of 13 or more days of age. As anaphylactogenic agents, aqueous base yellow fever vaccines and normal embryo extracts prepared from 10-day or younger chick embryos have been found to be distinctly inferior to those prepared from 13- or 14-day embryos. *Differences in anaphylactogenicity appear to depend upon qualitative rather than quantitative factors.* Protein content per unit volume of embryo extract (as measured by total nitrogen determinations) increases with increasing age. However, when volumes are so adjusted that sensitizing and challenging doses of the various embryo preparations contain equivalent amounts of nitrogen, it is found that doses which sensitize guinea pigs readily against 14-day material fail in large measure to produce sensitization against 10-day embryo extracts. The results have been the same in every experiment carried out: older embryos are more potent as anaphylactogens than younger embryos.

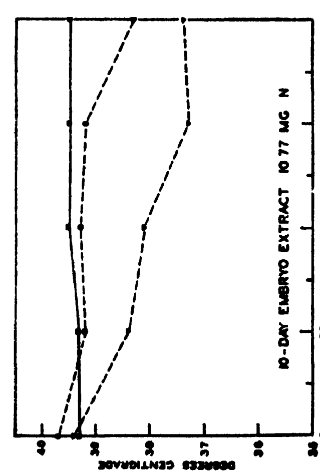
The authors make no assumption that all or a majority of the experimental animals tested cannot be sensitized against chick embryo material of less than 10 days' age. Most of the guinea pigs could undoubtedly be sensitized by the use of repeated injections or employment of larger doses. It should be understood, however, that it was not our purpose to determine the limits of sensitizing and challenging doses, but rather to measure possible differences in antigenicity of the several embryo preparations under consideration. Further investigations concerning the specificity of the reactions obtained in these studies are now under way.

In the light of the work reported here, it is interesting to note that in the extensive experience with 17–D yellow fever vaccine prepared from chick embryos of 10 and 11 days, incubation at the time of harvest (*14*, *15*, *16*), no anaphylactic reactions have been reported. The same is true with yolk membrane vaccines for typhus fever, spotted fever, and American "Q" fever, where the age of the tissues is even less than 10 days. On the other hand, chick embryo equine encephalomyelitis vaccine is generally prepared from embryos which have been incubated for a period of 13 to 14 days· and it is with this type of vaccine that most of the unfavorable reactions have been noted.


9-DAY EMBRYO EXTRACT 10 79 MG N
MINUTES AFTER INJECTION
DEGREES CENTIGRADE


11-DAY EMBRYO EXTRACT 10 95 MG N
MINUTES AFTER INJECTION
DEGREES CENTIGRADE


8 DAY EMBRYO EXTRACT 10 73 MG N
MINUTES AFTER INJECTION
DEGREES CENTIGRADE


10-DAY EMBRYO EXTRACT 10 77 MG N
MINUTES AFTER INJECTION
DEGREES CENTIGRADE

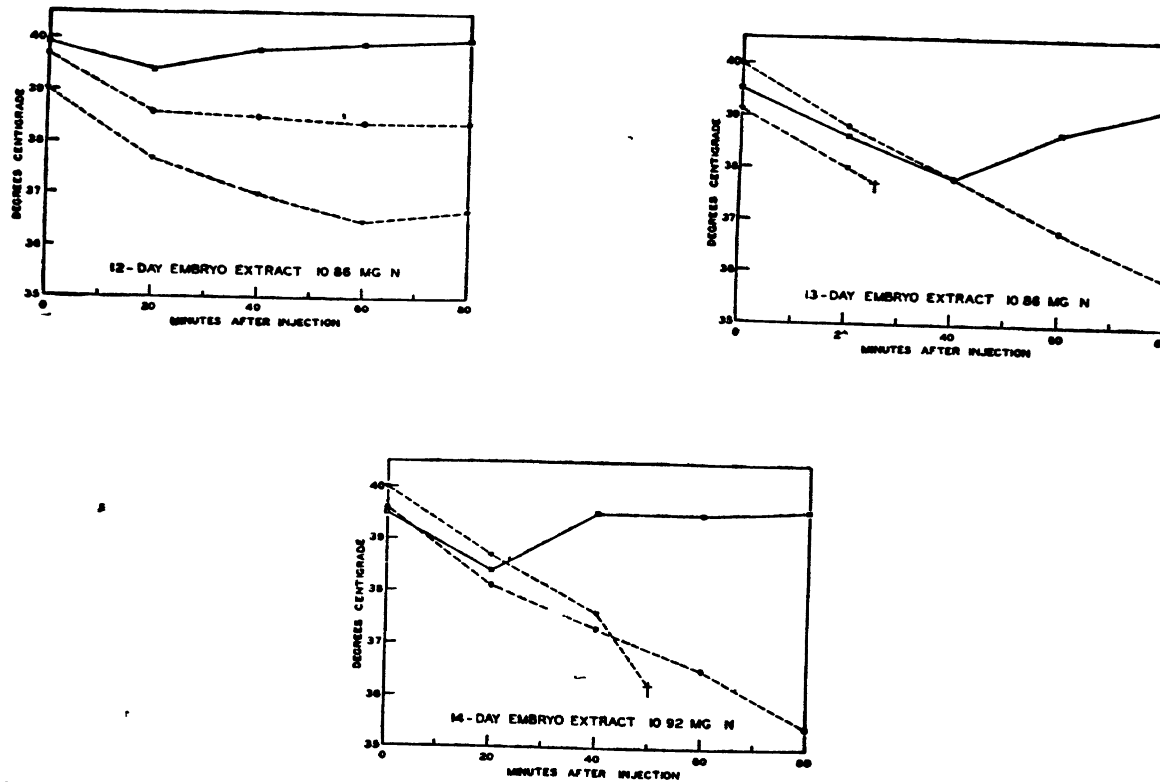


FIGURE 2.—Rectal temperature changes in sensitized and nonsensitized guinea pigs following intraperitoneal injections with normal chick-embryo aqueous extracts

NOTE —Solid lines indicate nonsensitized guinea pigs, broken lines indicate sensitized animals, † indicates death

Utilizing equine encephalomyelitis vaccine prepared at the laboratories of the Army Veterinary School from 11-day chick embryos, as described by Randall (*17*), the Army Veterinary Corps (*18*) reports the successful immunization of all horses and mules of the military service without encountering unfavorable reactions. Approximately 3,500 were inoculated with chick-embryo vaccine during 1938, and about 35,000 each year during 1939 and 1940. Two 10 ml. doses of vaccine were administered at 7-day intervals in each course of injections. In 1941 nearly 50,000 animals were vaccinated intradermally with smaller doses. Among these animals, thousands of which had thus received at least two series of large subcutaneous doses of the 11-day embryo equine encephalomyelitis vaccine, only one or two reactions of a true anaphylactic type were encountered. Several others of a minor nature were noted.

These findings offer indirect evidence in support of the results reported in this paper.

CONCLUSIONS

Chick-embryo protein derived from embryos of different ages possesses the power to produce anaphylactic sensitization in young guinea pigs in direct ratio to the age of the embryos employed. When doses of comparable nitrogen content are employed, chick-embryo extract from 10-day or younger embryos is found to be weakly anaphylactogenic, while that from 14-day embryos is highly so.

If the results obtained with guinea pigs can be applied to human beings, the probability of sensitization with biologics prepared from chick embryos would be greater when 13- or 14 day embryos are used than when younger embryos are employed.

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PUBLIC HEALTH SERVICE PUBLICATIONS

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The purpose of the publication of this list is to provide a complete and continuing record of Public Health Service publications, for reference use by librarians, scientific workers, and others interested in particular fields of public health work, and not to offer the publications for indiscriminate free public distribution.

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Periodicals

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*Venereal Disease Information (monthly), July–December, vol. 22, Nos. 7 to 12, pages 232 to 456. 5 cents a number.

*Journal of the National Cancer Institute (bimonthly), August–December, vol. 2, Nos. 1 to 3, pages 1 to 308. 40 cents a number.

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2292 Protective antibodies against St Louis encephalitis virus in the serum of horses and man By Cornelius B Philip Herald R Cox and John H Fountain July 4 1941 4 pages

2293 Suceptibility of horses to St Louis encephalitis virus By Herald R Cox Cornelius B Philip and J W Kilpatrick July 4 1941 2 pages

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2308 The specificity of the complement fixation test in endemic typhus fever using a rickettsial antigen By Ida A Bengtson and Norman H. Topping August 29, 1941 5 pages

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2310. Leprosy: Complement fixation with Gaehtgens' spirochete antigen compared with standard Wassermann and Kahn tests. By D. W. Patrick and D. M. Wolfe. August 29, 1941. 4 pages.
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2331. Directory of State and insular health authorities, 1941. November 7, 1941. 18 pages.
2332. Blindness, as recorded in the National Health Survey—amount, causes, and relation to certain social factors. By Rollo H. Britten. November 14, 1941. 25 pages.
2333. Treatment of dietary liver cirrhosis in rats with choline and casein. By J. V. Lowry, Floyd S. Daft, W. H. Sebrell, L. L. Ashburn, and R. D. Lillie. November 14, 1941. 4 pages.
2334. Distribution of health services in the structure of State government. Chapter II. Communicable disease control by State agencies. By Joseph W. Mountin and Evelyn Flook. November 21, 1941. 26 pages.
2335. *Ornithodoros turicata* and relapsing fever spirochetes in New Mexico. By Gordon E. Davis. November 21, 1941. 4 pages.
2336. Facilities in the United States for the special care of children with rheumatic heart disease. By O. F. Hedley. December 5, 1941. 21 pages.
2337. Siphonaptera: The genera *Amphalius* and *Ctenophyllus* in North America. By William L. Jellison. December 5, 1941. 8 pages.
2338. Child health and the Selective Service physical standards. By Antonio Ciocco, Henry Klein, and Carroll E. Palmer. December 12, 1941. 11 pages.
2339. Industrial injuries among the urban population as recorded in the National Health Survey. By Joan Klebba. December 12, 1941. 18 pages.
2340. Quantitative studies of the tuberculin reaction. II. The efficiency of a quantitative patch test in detecting reactors to low doses of tuberculin. By Michael L. Furcolow and Edward L. Robinson. December 19, 1941. 11 pages.
2341. Studies of the acute diarrheal diseases. V. An outbreak due to *Salmonella typhi murium*. By W. E. Mosher, Jr., S. M. Wheeler, H. L. Chant, and A. V. Hardy. December 19, 1941. 12 pages.
2342. Relapsing fever: *Ornithodoros parkeri* a vector in California. By Gordon E. Davis, Harlin L. Wynns, and M. Dorthy Beck. December 19, 1941. 2 pages.
2343. Studies of sewage purification. XV. Effective bacteria in purification by trickling filters. By C. T. Butterfield and Elsie Wattie. December 26, 1941. 20 pages: 1 plate.
2344. *Ornithodoros parkeri* and relapsing fever spirochetes in Utah. By Gordon E. Davis. December 26, 1941. 5 pages.

Supplements to the Public Health Reports

164. A study of the public mental hospitals of the United States 1937–39. By Samuel W. Hamilton, Grover A. Kempf, Grace C. Scholz, and Eve G. Caswell. 1941. 126 pages.
166. The notifiable diseases. Prevalence in States, 1940. 1941. 14 pages.

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268. Heart disease in Philadelphia cardiac clinics. A composite picture of the etiological types in the clinics of 15 hospitals, with special reference to rheumatic heart disease and syphilis of the aorta and heart. By O. F. Hedley. 1941. 38 pages.
269. The health of workers in dusty trades. VII. Restudy of a group of granite workers. By Albert E. Russell. 1941. 71 pages; 43 plates.

270. Soft coal miners—health and working environment. By Robert H. Flinn, Harry E. Seifert, Hugh P. Brinton, J L. Jones, and R. W. Franks. 1941. 118 pages; 31 halftones.
271. The aromatic amino and nitro compounds, their toxicity and potential dangers. A review of the literature. By W. F. von Oettingen. 1941. 221 pages.
272. The toxicity and potential dangers of nitrous fumes. By W. F. von Oettingen 1941. 34 pages.
273. The socio-economic and employment status of urban youth in the United States, 1935–36. By Bernard D. Karpinos. 1941. 58 pages.
274. Studies on the mechanism of carbon monoxide poisoning as observed in dogs anesthetized with sodium amytal. By W. F. von Oettingen, D. D. Donahue, P. J. Valaer, and J. W. Miller. 1941. 50 pages; 1 halftone.
275. Cancer mortality in the United States. IV. Age variation in mortality from cancer of specific sites, 1930–32. By Mary Gover. 1941. 57 pages.
276. A study of the pollution and natural purification of the Scioto River. By Robert W. Kehr, W. C. Purdy, James B. Lackey, Oliver R. Placak, and William E. Burns. 1941. 153 pages, 9 halftones.

Miscellaneous Publication

21. Until the doctor comes. By James A. Dolce 1941. 60 pages. (Supersedes "What to Do in Case of Accident.")

Reprints From the Journal of the National Cancer Institute

39. Early diagnosis of cancer of the stomach; gastroscopy and gastric biopsies, gastrophotography and X-rays. By Rudolph Schindler. February 1941. 20 pages; 1 plate; 29 halftones.
46. Possibilities of improved therapy for cancer patients. By Carl Voegtlin. April 1941. 14 pages; 1 halftone.
47. Effect of foster nursing on the response of mice to estrogens. By Michael B. Shimkin and Howard B. Andervont. April 1941. 7 pages.
48. Studies on the purification and properties of the rabbit-papilloma-virus protein. By W. Ray Bryan and J. W. Beard. April 1941. 67 pages.
49. The peptidase activities of the cathepsins of normal rat tissue and of Jensen rat sarcoma. By Mary E. Maver, J. M. Johnson, and J. W. Thompson. April 1941. 12 pages.
50. Chemical studies on the components of normal and neoplastic tissues. V. The relative arginase activity of certain tumors and normal control tissues. By Jesse P. Greenstein, Wendell V. Jenrette, G. Burroughs Mider, and Julius White. April 1941. 20 pages.
51. Induction of tumors in guinea pigs with subcutaneously injected methylcholanthrene. By Michael B. Shimkin and G. Burroughs Mider. April 1941. 19 pages; 7 plates.

Workers Health Series

3. KO by CO gas.
4. Clara gives benzol the run around.
5. Trouble in the midriff.

Unnumbered Publications

Index to Public Health Reports, volume 56, part 1, January–June 1941. 24 pages.

Index to Journal of the National Cancer Institute, volume 1, August 1940–June 1941. 9 pages.

Reprints From Venereal Disease Information

154. Toxic dose of mapharsen given by the continuous drip method. By Harold J. Magnuson and B. O. Raulston. Vol. 22, May 1941. 10 pages.
155. Evaluating a serologic test for syphilis in a metropolitan community. By Nathan Nagle and J. C. Willett. Vol. 22, May 1941. 6 pages.
156. Preservation of the gonococcus in frozen urines and broth. By Morris S. Wortman, Axel Gronau, Rogers Deakin, and Frances Love. Vol. 22, June 1941. 3 pages.
157. Case-finding with gonorrhea patients in a clinic for venereal diseases. By Edgar C. Baldock. Vol. 22, June 1941. 4 pages.
158. Syphilis-malaria survey, Onslow County, North Carolina. By Frank S. Fellows and William B. Perry. Vol. 22, July 1941. 11 pages.
159. Spontaneous healing and progression in untreated venereal lymphogranuloma. By Robert Brandt. Vol. 22, July 1941. 6 pages.
160. The technic of induced malaria as used in the South Carolina State Hospital. By Bruce Mayne and Martin D. Young. Vol. 22, August 1941. 6 pages.
161. The indications for therapeutic malaria in the various forms of neurosyphilis. By Josef Gerstmann. Vol. 22, August 1941. 4 pages.
162. Interstitial keratitis, standardization of treatment. By Joseph V. Klauder and Eleanor Vandoren. Vol 22, September 1941. 16 pages.
163. Gonococcal infection in the female. By Robert M. Lewis. Vol. 22, October 1941. 8 pages.
164. Significance of syphilis in pregnancy. By Ernest B. Howard. Vol. 22, November 1941. 8 pages.

Venereal Disease Posters

14. Make our men as fit as our machines.
15. No home remedy ever cured gonorrhea.
16. Prostitution spreads syphilis and gonorrhea.
17. Know for sure—get blood test before marriage.

TOXICITY OF AROMATIC AMINO AND NITRO COMPOUNDS [1]

A Review

Public Health Bulletin No. 271, which was recently issued, gives a discussion of the toxicity and potential dangers of the aromatic amino and nitro compounds, including the phenylhydrazine and phenylhydroxylamine derivatives and the amino and nitro naphthalene derivatives. Some of these chemicals, such as aniline and toluidine, including some of their derivatives, are of great importance in the manufacturing of dyestuffs; others such as dinitrobenzene, di- and trinitrotoluene, dinitrophenol, and tetryl play an important role in the explosives industry, and a knowledge of the health hazards connected

[1] The aromatic amino and nitro compounds, their toxicity and potential dangers. A review of the literature. By W. F. von Oettingen. Public Health Bulletin No. 271. Government Printing Office, 1941. Available from the Superintendent of Documents, Washington, D. C., at 25 cents per copy.

with their handling is, therefore, of great importance in connection with our war efforts.

Whereas many of these compounds have been studied very thoroughly, both from the experimental and from the industrial hygiene point of view, very little information may be found on others. For this reason, the material is not restricted to those aromatic nitro and amino compounds which are of immediate practical importance, but other compounds are also discussed, especially those which allow conclusions regarding the relation between their chemical constitution and their pharmacological and toxicological action. This information will allow the appraisal of the toxicity and potential dangers of those chemicals which may give rise to untoward effects and which have not been studied hitherto in this respect.

DEATHS DURING WEEK ENDED APRIL 18, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Apr 18, 1942	Corresponding week, 1941
Data from 88 large cities of the United States		
Total deaths	8,750	8,840
Average for 3 prior years	8,864	
Total deaths, first 15 weeks of year	136,774	140,401
Deaths per 1,000 population, first 15 weeks of year, annual rate	12.7	13.1
Deaths under 1 year of age	607	565
Average for 3 prior years	509	
Deaths under 1 year of age, first 15 weeks of year	8,533	8,019
Data from industrial insurance companies		
Policies in force	64,975,551	64,570,519
Number of death claims	13,039	12,263
Death claims per 1,000 policies in force, annual rate	10.5	9.9
Death claims per 1,000 policies, first 15 weeks of year, annual rate	10.2	10.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED APRIL 25, 1942

Summary

The incidence of most of the common communicable diseases reported in the following weekly table remained below the 5-year (1937–41) median expectancy during the current week.

Although the total number of reported cases of measles is about 51 percent of the number reported for the corresponding week last year, it is 58 percent above the 5-year median expectancy. The largest numbers of cases are being reported from California and Texas, where some areas are stated to be having the severest epidemic on record. Of a total of 279,623 cases in the entire country to date this year (first 16 weeks), California has reported 61,939 and Texas 30,101—a total of 92,040 cases, or 33 percent, in these two States which have about 10 percent of the total population. For the current week these States reported about one-third of the total cases and for the preceding week about 35 percent.

The number of cases of meningococcus meningitis declined from 88 for the preceding week to 79, while the number of cases of poliomyelitis increased slightly—from 14 to 16 (5-year median, 17). Of 19 cases of smallpox (the lowest recorded figure for the week), 9 were reported in Missouri. The diphtheria incidence (201 cases) is also the lowest on record for this week.

Other current reports include 1 case of anthrax (in Pennsylvania), 3 cases of leprosy (2 in California, 1 in Texas), 11 cases of tularemia, 20 cases of endemic typhus fever, and 7 cases of Rocky Mountain spotted fever (all in the northwestern States).

The death rate for the current week for 88 large cities of the United States is 11.6 per 1,000 population, as compared with 12.2 for the preceding week and 11.9 for the 3-year (1939–41) average for the corresponding week. The accumulated rate to date this year is 12.7, as compared with 13.0 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended April 25, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that although none were reported cases may have occurred

Division and State	Diphtheria: Week ended Apr 25, 1942	Diphtheria: Week ended Apr 26, 1941	Diphtheria: Median 1937-41	Influenza: Week ended Apr 25, 1942	Influenza: Week ended Apr 26, 1941	Influenza: Median 1937-41	Measles: Week ended Apr 25, 1942	Measles: Week ended Apr 26, 1941	Measles: Median 1937-41	Meningitis, meningococcus: Week ended Apr 25, 1942	Meningitis, meningococcus: Week ended Apr 26, 1941	Meningitis, meningococcus: Median 1937-41
NEW ENG												
Maine	1	1	2			1	185	84	84	3	0	0
New Hampshire	0	0	0	2			8	49	26	0	0	0
Vermont	0	0	0				125	81	[illegible]	0	0	0
Massachusetts	2	3	3				1,187	1,190	[illegible]21	7	2	2
Rhode Island	1	3	0				208	3	49	0	0	0
Connecticut	2	3	3		5	[illegible]	90	380	380	2	0	0
MID ATL												
New York	20	13	24	[illegible]	[1] 12	[1] 12	[illegible]45	6,513	1,782	13	4	5
New Jersey	5	3	11	5	31	8	[illegible]3	3,86[illegible]	1,834	5	3	2
Pennsylvania	6	11	28				1,419	5,789	1,112	7	7	8
E NO CEN												
Ohio	6	8	8	10	12	12	342	7,182	1,041	0	1	1
Indiana	5	8	8	7	16	13	171	1,121	400	0	0	0
Illinois	11	17	27	6	12	12	601	2,812	188	1	3	3
Michigan [2]	6	0	4	1	11	14	42[illegible]	3,581	[illegible]74	6	0	2
Wisconsin	1	2	1	60	73	[illegible]2	1,020	1,832	[illegible]1	1	0	1
W NO CEN												
Minnesota	2	3	3	1	4	2	980	47	120	0	0	0
Iowa	2	0	3	5	18	18	31	213	213	0	0	0
Missouri	4	1	7		7	7	[illegible]0	523	56	2	1	1
North Dakota	2	7	1	74	9	9	71	4[illegible]	24	0	0	0
South Dakota	5	0	0		1	1	13	14	1	0	1	0
Nebraska	3	3	1	14			400	1	18	0	0	0
Kansas	2	6	3	3	7	7	720	1,0[illegible]4	630	0	1	0
SO ATL												
Delaware	0	0	1				4	228	40	0	0	0
Maryland [2]	6	3	2	6	25	10	90	409	409	4	2	2
Dist of Col	1	0	2	2			112	370	107	2	0	0
Virginia	4	8	9	217	430	175	247	2,23[illegible]	617	3	10	2
West Virginia	4	2	4	42	15	32	246	753	108	2	0	3
North Carolina	8	19	15	34	12	14	864	1,590	761	0	2	2
South Carolina	2	2	4	265	328	328	113	639	64	0	1	1
Georgia	6	3	4	47	358	131	201	734	91	2	1	0
Florida	2	5	2	1	77	7	171	606	232	0	1	0
E SO CEN												
Kentucky	2	5	5	6	5	15	[illegible]7	1,482	375	2	2	2
Tennessee	3	3	3	16	60	60	121	650	127	1	2	2
Alabama	4	10	5	172	39	93	113	933	17[illegible]	8	3	3
Mississippi [2]	8	5	5							1	2	1
W SO CEN												
Arkansas	4	3	4	76	96	9[illegible]	132	479	58	0	1	1
Louisiana	0	6	9	2	2	12	184	67	15	1	0	0
Oklahoma	3	2	4	45	76	85	306	184	123	0	2	1
Texas	30	28	28	554	729	564	1,974	1,541	811	0	0	1
MOUNTAIN												
Montana	1	3	0	4	19	6	158	30	30	0	1	0
Idaho	0	0	0		1	3	131	23	37	0	0	0
Wyoming	1	0	0	141			54	52	15	0	0	0
Colorado	7	11	11	39	14	9	310	445	352	1	0	0
New Mexico	7	1	1	1	1	1	99	214	70	0	0	0
Arizona	2	0	1	80	73	73	145	110	89	0	0	0
Utah [2]	0	1	0	11	7	7	441	36	146	0	0	0
Nevada	0	0					273	1		0	0	
PACIFIC												
Washington	1	3	0	4			377	103	103	3	0	0
Oregon	0	4	2	17	11	18	165	364	96	0	0	0
California	9	18	18	164	272	69	6,074	383	397	2	3	2
Total	201	287	288	2,140	2,874	2,117	24,674	50,854	15,568	79	56	56
16 weeks	4,687	4,525	7,530	69,366	472,451	149,614	279,623	533,799	211,902	1,232	823	822

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended April 25, 1942 and comparison with corresponding week of 1941 and 5-year median—Con

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41
	Apr 25 1942	Apr 26 1941		Apr 25 1942	Apr 26 1941		Apr 25 1942	Apr 26 1941		Apr 25 1942	Apr 26 1941	
NEW ENG												
Maine	0	0	0	29	3	23	0	0	0	1	0	0
New Hampshire	0	0	0	10	1	6	0	0	0	0	0	0
Vermont	0	0	0	6	20	13	0	0	0	0	0	0
Massachusetts	0	0	0	391	222	222	0	0	0	0	1	1
Rhode Island	0	0	0	10	6	17	0	0	0	0	0	0
Connecticut	0	0	0	[illegible]	74	119	0	0	0	0	2	1
MID ATL.												
New York	3	0	0	464	433	822	0	0	0	7	7	7
New Jersey	0	0	0	137	267	205	0	0	0	0	0	4
Pennsylvania	0	1	1	540	393	476	0	0	0	8	7	7
E NO CEN												
Ohio	0	1	1	281	261	261	0	0	0	6	1	3
Indiana	2	0	0	102	118	160	1	0	19	2	0	1
Illinois	0	0	0	204	313	487	0	1	17	6	1	3
Michigan [2]	0	0	0	288	250	454	0	0	4	3	1	2
Wisconsin	0	1	0	162	114	167	0	14	5	0	0	1
W NO CEN												
Minnesota	0	0	0	50	38	90	0	3	9	1	1	1
Iowa	0	0	0	35	50	107	0	6	34	0	2	1
Missouri	0	0	0	91	98	86	9	3	27	6	0	2
North Dakota	0	0	0	18	2	13	0	0	5	0	0	0
South Dakota	0	0	0	26	18	18	0	0	7	0	0	0
Nebraska	0	0	0	28	15	19	0	0	1	0	0	0
Kansas	0	0	0	96	33	97	0	0	5	0	0	1
SO ATL.												
Delaware	0	0	0	45	38	11	0	0	0	0	0	0
Maryland [2]	0	3	0	80	40	40	0	0	0	1	0	2
Dist of Col	0	0	0	13	8	18	0	0	0	0	1	0
Virginia	0	1	0	12	31	31	0	0	0	1	3	1
West Virginia	0	0	0	31	44	44	0	0	0	2	2	1
North Carolina	0	0	0	2	26	27	0	0	1	1	3	2
South Carolina	2	0	0	3	1	2	0	0	0	0	2	2
Georgia	1	0	0	10	18	6	1	0	0	10	1	3
Florida	1	2	0	4	6	6	0	0	0	9	1	2
E SO CEN												
Kentucky	1	0	0	71	87	60	0	0	1	0	4	4
Tennessee	0	0	0	50	65	51	1	0	0	4	2	1
Alabama	0	2	0	9	17	10	0	0	0	2	1	1
Mississippi [2]	1	0	1	12	7	3	1	2	1	2	5	0
W SO CEN												
Arkansas	0	0	0	4	7	7	1	1	3	0	1	3
Louisiana	0	0	0	8	5	9	0	1	0	6	8	8
Oklahoma	0	0	0	7	8	12	0	0	3	1	0	0
Texas	4	2	2	36	43	43	3	3	7	6	6	7
MOUNTAIN												
Montana	0	2	0	17	42	25	0	1	2	0	0	0
Idaho	0	0	0	1	11	7	0	0	3	0	0	0
Wyoming	0	0	0	9	12	7	0	0	0	0	0	0
Colorado	0	0	0	22	20	44	0	0	4	0	1	1
New Mexico	0	0	0	5	5	16	0	0	0	1	0	1
Arizona	0	0	0	2	12	7	0	0	0	0	1	1
Utah [2]	0	0	0	16	10	18	0	0	1	0	0	0
Nevada	0	0		6	0		0	0		0	0	-
PACIFIC												
Washington	0	1	0	23	15	35	0	2	2	1	0	0
Oregon	0	0	0	9	13	18	2	9	10	0	0	0
California	1	1	1	102	145	154	0	0	11	3	9	7
Total	16	17	17	3,606	3,465	5,042	19	46	366	90	74	98
16 weeks	342	364	339	63,090	60,560	81,915	361	715	5,097	1,215	1,208	1,751

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended April 25, 1942, and comparison with corresponding week of 1941—Continued

Division and State	Whooping cough, Week ended Apr. 25, 1942	Whooping cough, Week ended Apr. 26, 1941	Week ended Apr 25, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	18	19	0	0	0	0	0	0	0	0	0
New Hampshire	6	0	0	0	0	0	0	0	0	0	0
Vermont	40	14	0	0	0	0	0	0	0	0	0
Massachusetts	206	215	0	0	0	0	0	0	0	0	0
Rhode Island	16	20	0	0	0	0	0	0	0	0	0
Connecticut	74	73	0	0	1	0	0	0	0	0	0
MID ATL.											
New York	441	348	0	2	6	0	2	0	0	0	1
New Jersey	299	103	0	1	0	0	0	0	0	0	0
Pennsylvania	282	375	1	1	0	0	0	0	0	0	0
E NO CEN.											
Ohio	148	365	0	0	0	0	0	0	0	0	0
Indiana	55	39	0	0	0	0	0	0	0	0	0
Illinois	229	72	0	1	0	0	1	0	0	1	0
Michigan [1]	215	318	0	0	0	0	1	0	0	0	0
Wisconsin	227	119	0	0	0	0	0	0	0	0	0
W NO CEN.											
Minnesota	40	121	0	2	0	0	0	0	0	0	0
Iowa	37	39	0	0	0	0	0	0	0	0	0
Missouri	11	59	0	0	0	1	0	0	0	0	0
North Dakota	17	23	0	0	0	0	0	0	0	0	0
South Dakota	6	17	0	0	0	0	0	0	0	0	0
Nebraska	2	24	0	0	0	0	0	0	0	0	0
Kansas	33	116	0	0	0	0	1	0	0	0	0
SO ATL											
Delaware	1	8	0	0	0	0	0	0	0	0	0
Maryland [2]	63	112	0	0	0	2	0	0	0	1	0
District of Columbia	13	22	0	0	0	0	0	0	0	0	0
Virginia	84	131	0	1	0	11	0	0	0	0	0
West Virginia	12	67	0	0	0	0	0	0	0	0	0
North Carlina	117	349	0	0	0	0	0	0	0	0	2
South Carolina	63	171	0	0	0	0	0	0	0	0	0
Georgia	13	28	0	1	4	0	0	0	0	3	7
Florida	14	23	0	0	0	0	0	0	0	0	2
E SO CEN.											
Kentucky	89	95	0	0	0	0	0	0	0	0	0
Tennessee	29	55	0	0	0	0	1	0	0	2	0
Alabama	35	107	0	0	0	0	2	0	0	0	2
Mississippi [2]	------	------	0	0	0	0	0	0	0	0	0
W SO CEN											
Arkansas	7	38	0	3	0	0	0	0	0	1	0
Louisiana	4	8	0	0	1	0	0	0	0	1	1
Oklahoma	12	37	0	0	0	0	1	0	0	0	0
Texas	126	339	0	4	33	0	0	1	0	0	5
MOUNTAIN											
Montana	20	16	0	0	0	0	0	0	3	0	0
Idaho	3	9	0	0	0	0	0	0	0	0	0
Wyoming	27	8	0	0	0	0	0	0	2	0	0
Colorado	18	191	0	0	0	0	0	0	0	0	0
New Mexico	39	26	0	1	0	0	0	0	0	0	0
Arizona	21	34	0	0	0	10	0	0	0	0	0
Utah [2]	80	55	0	0	0	0	0	0	0	1	0
Nevada	4	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	105	145	0	0	0	0	0	0	0	0	0
Oregon	44	28	0	0	0	0	0	0	2	0	0
California	354	683	0	0	3	0	1	2	0	1	0
Total	3,749	5,259	1	17	48	24	10	3	7	11	20
16 weeks	61,495	71,639									

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended April 11, 1942

This table lists the reports from 88 cities of more than 10 000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis infectious cases	Influenza		Measles cases	Meningitis meningococcus cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta Ga	0	0	10	0	0	0	3	0	5	0	0	0
Baltimore Md	0	1	3	1	409	0	16	0	27	0	0	22
Barre Vt	0	0		0	0	0	0	0	0	0	0	2
Billings Mont	0	0		0	3	0	2	0	0	0	0	0
Birmingham Ala	0	0	8	2	8	1	2	0	4	0	0	3
Boise Idaho	0	0		0	2	0	0	0	4	0	0	0
Boston Mass	0	0		0	195	2	12	0	83	0	0	42
Bridgeport Conn	0	0	1	1	28	1	3	0	3	0	0	1
Brunswick Ga	0	0		0	7	0	0	0	0	0	0	0
Buffalo, N Y	0	0		0	12	0	8	0	13	0	0	2
Camden N J	1	0		0	1	0	3	0	13	0	0	1
Charleston S C	0	0	20	0	3	0	1	0	1	0	0	0
Charleston W Va	0	0		0	0	0	0	0	0	0	0	0
Chicago Ill	11	0	4	2	133	1	26	0	92	1	0	87
Cincinnati Ohio	0	0	1	1	6	0	4	0	22	0	0	10
Cleveland Ohio	0	0	3	0	9	1	6	0	83	0	0	24
Columbus Ohio	0	0		0	42	0	5	0	11	0	0	3
Concord N H	0	0		0	0	0	2	0	2	0	0	0
Cumberland Md	0	0		0	2	0	0	0	2	0	0	1
Dallas Tex	5	0		0	199	0	1	0	3	0	0	6
Denver Colo	3	0	17	0	156	0	6	0	8	0	0	12
Detroit Mich	5	0	3	0	50	0	16	0	83	0	1	45
Duluth Minn	0	0		1	6	0	0	0	8	0	0	0
Fall River Mass	1	0		0	57	0	0	0	74	0	0	0
Fargo N Dak	0	0		1	0	0	0	0	0	0	0	5
Flint, Mich	0	0		0	2	0	4	0	1	0	0	3
Fort Wayne Ind	0	0		0	1	0	6	0	0	0	0	0
Frederick Md	0	0		0	6	0	1	0	1	0	0	0
Galveston Tex	0	0		0	2	0	0	1	0	0	0	0
Grand Rapids Mich.	0	0		0	5	0	1	0	2	0	0	3
Great Falls Mont	0	0		0	28	0	0	0	0	0	0	2
Hartford Conn	0	0		0	62	0	3	0	2	0	0	10
Helena Mont	0	0		0	0	0	1	0	0	0	0	1
Houston Tex	1	0		0	96	0	6	0	1	0	0	2
Indianapolis Ind	2	0		0	71	1	10	0	26	0	0	16
Kansas City, Mo	2	0		1	92	1	8	0	35	0	0	3
Kenosha Wis	0	0		0	8	0	0	0	2	0	0	12
Los Angeles Calif	4	0	17	0	761	2	13	0	12	0	0	29
Lynchburg Va	0	0		0	1	0	2	0	0	0	0	19
Memphis Tenn	0	0		1	20	0	3	0	6	0	0	3
Milwaukee Wis	0	0	1	1	166	0	5	0	24	0	0	40
Minneapolis, Minn	0	0		0	355	0	5	0	16	0	0	9
Missoula Mont	0	0		0	1	0	0	0	0	0	0	1
Mobile Ala	0	0	3	1	2	1	3	0	2	0	0	0
Nashville Tenn	0	0		0	2	0	3	0	4	0	0	0
Newark N J	0	0	1	1	213	0	4	0	23	0	0	39
New Haven Conn	0	0		0	214	0	1	0	1	0	0	4
New Orleans La	1	0	3	1	89	2	3	0	3	0	1	2
New York N Y	10	0	10	0	89	12	74	2	281	0	6	252
Omaha Nebr	1	0		0	155	0	6	0	7	0	0	3
Philadelphia Pa	2	1	1	2	48	6	28	0	197	0	1	91
Pittsburgh Pa	2	0		0	14	1	11	0	13	0	1	24
Portland Maine	0	0		0	5	0	7	0	1	0	0	3
Providence R I	0	0		0	253	0	7	0	3	0	9	23
Pueblo, Colo	0	0		0	0	0	2	0	2	0	0	0
Racine Wis	0	0		0	41	0	0	0	4	0	0	9
Raleigh, N C	0	0		0	1	0	0	0	0	0	0	0
Reading, Pa	0	0		0	1	0	1	0	1	0	0	2
Richmond, Va	0	0	9	0	2	0	6	0	4	0	1	0

City reports for week ended April 11, 1942—Continued

	Diphtheria cases	Encephalitis, infectious cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis meningococcus cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va	0	0		0	1	0	0	0	0	0	0	2
Rochester, N Y	0	0		0	8	0	0	0	11	0	0	1
Sacramento, Calif	0	0	1	1	137	0	1	0	0	0	0	25
Saint Louis, Mo	2	0	5	0	231	0	8	0	23	0	0	3
Saint Paul, Minn	0	0		1	336	0	6	0	3	0	0	24
Salt Lake City, Utah	0	0		0	32	0	2	0	5	0	0	11
San Antonio, Tex	1	0	1	0	35	0	5	0	1	0	0	2
San Francisco, Calif	0	0		1	190	0	7	0	7	0	0	6
Savannah, Ga	0	0	5	0	4	0	1	0	1	0	0	1
Seattle, Wash	0	0		0	35	2	2	0	0	0	1	18
Shreveport, La	0	0		0	7	0	5	0	0	0	0	0
South Bend, Ind	0	0		0	3	0	1	0	10	0	0	0
Spokane, Wash	0	0		0	17	1	2	0	2	0	1	5
Springfield, Ill	0	0	-	0	232	1	2	0	1	0	0	0
Springfield, Mass	0	0		0	54	0	6	0	18	0	0	6
Superior, Wis	0	0		0	3	0	0	0	0	0	0	4
Syracuse, N Y	0	0		0	84	0	3	0	2	0	0	21
Tacoma, Wash	0	0		0	2	0	4	0	5	0	0	2
Tampa, Fla	0	0	2	2	11	0	2	0	0	0	2	1
Terre Haute, Ind	0	0		1	7	0	4	0	0	0	0	0
Topeka, Kans	0	0		0	15	1	0	0	3	0	0	4
Trenton, N J	0	0	4	0	3	0	2	0	6	0	0	10
Washington, D C	1	0	3	0	134	0	8	0	12	0	0	14
Wheeling, W Va	0	0		0	12	0	1	0	1	0	0	0
Wichita, Kans	0	0		0	75	0	0	0	4	0	0	2
Wilmington, Del	0	0		0	6	0	1	0	3	0	0	0
Wilmington, N C	0	0		0	32	0	2	0	0	0	0	0
Winston-Salem, N C	0	0		0	59	0	2	0	0	0	0	0
Worcester, Mass	0	0		0	8	0	12	0	17	0	0	33

Dysentery, amebic.—Cases Chicago, 1 New York, 1, Philadelphia, 1
Dysentery, bacillary.—Cases Cleveland, 1 Salt Lake City, 1
Leprosy.—Cases Chicago 1, New York, 1
Pellagra.—Cases Philadelphia, 1
Typhus fever.—Cases New York, 1

Rates (annual basis) per 100,000 population for a group of 88 selected cities (population 1942, 33,926,637)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
Week ended April 11, 1942	8 45	22 29	3 53	917 09	65 93	207 95	0 15	3 69	163 68
Average for week 1937-41	14 74	42 66	9 77	1,277 54	95 41	291 81	2 17	2 95	185 23

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—Rats proved positive for plague have been found in Paauhau, Hamakua District, Island of Hawaii, T. H., as follows: One rat on February 26, one rat on March 2, and one rat on March 10, 1942.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended March 28, 1942—During the week ended March 28, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		3		1	7	2				13
Chickenpox		5		167	273	27	37	12	97	618
Diphtheria	1	15	1	10	5	5		4	3	44
Dysentery				11					1	12
German measles	1			21	85	3	20	24	39	193
Influenza		4			19	2			16	41
Measles		3	1	508	168	205	26	21	22	954
Mumps	1	26	8	603	438	104	165	103	564	2,007
Pneumonia		9			6	3	1		17	36
Poliomyelitis				1						1
Scarlet fever	8	24	7	67	326	55	27	59	26	599
Trachoma									3	3
Tuberculosis	3	27	3	100	39		8	1	41	222
Typhoid and paratyphoid fever				17	1			1		19
Undulant fever				2	1				1	4
Whooping cough		6		177	89	1	8	4	24	309
Other communicable diseases		20	1	5	270	3	1		6	306

CUBA

Habana—Communicable diseases—4 weeks ended April 4, 1942.—During the 4 weeks ended April 4, 1942, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	6	1	Poliomyelitis	1	
Leprosy	2		Tuberculosis	8	3
Malaria	2		Typhoid fever	31	4
Measles	17				

Provinces—Notifiable diseases—4 weeks ended March 28, 1942.—During the 4 weeks ended March 28, 1942, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	2	1	3	15	-	8	29
Chickenpox	-			26	1	9	36
Diphtheria		21	3	2	--	3	29
Hookworm disease		35	---	---		--	35
Leprosy		1		-	1	1	3
Malaria	239	9		6	--	279	533
Measles		23	16	86	7	3	135
Poliomyelitis		2		-		1	3
Tuberculosis	12	22	17	70	9	29	159
Typhoid fever	12	85	8	32	6	39	182
Whooping cough	1			1			2

[1] Includes the city of Habana

JAMAICA

Communicable diseases 4 weeks ended March 14, 1942.—During the 4 weeks ended March 14, 1942,[1] cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	11	11	Scarlet fever	---	1
Diphtheria	2	2	Tuberculosis	21	42
Erysipelas	1	-	Typhoid fever	6	35
Leprosy	---	1	Typhus fever	5	---
Puerperal fever	1	3			

[1] No report was received for the week ended March 7.

MALTA

Notifiable diseases—January 1942.—During the month of January 1942, certain notifiable diseases were reported in Malta, including the island of Gozo, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cancer	---	18	Measles	4	---
Cerebrospinal meningitis	2	1	Nephritis	---	4
Chickenpox	6	---	Pneumonia	62	16
Diabetes mellitus	---	21	Scarlet fever	1	---
Diarrhea and enteritis (under 2 years of age)	---	29	Trachoma	5	---
Diphtheria	18	3	Tuberculosis (respiratory system)	22	15
Erysipelas	11	---	Typhoid fever	21	2
Gastroenteritis	---	41	Undulant fever	17	2
Influenza	2	---	Whooping cough	48	1

NEW ZEALAND

Notifiable diseases—4 weeks ended January 26, 1942.—During the 4 weeks ended January 26, 1942, certain notifiable diseases were reported in New Zealand as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	28	4	Puerperal fever	10	1
Diphtheria	34	2	Scarlet fever	24	
Dysentery (bacillary)	5		Tetanus	2	2
Erysipelas	19		Trachoma	6	
Food poisoning	1		Tuberculosis	132	54
Lethargic encephalitis	1		Typhoid fever	5	
Ophthalmia neonatorum	1		Undulant fever	1	

SWITZERLAND

Notifiable diseases—November–December 1941.—During the months of November and December 1941, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	November	December	Disease	November	December
Cerebrospinal meningitis	10	10	Poliomyelitis	261	89
Chickenpox	214	219	Scarlet fever	278	374
Diphtheria	143	138	Trachoma		1
German measles	11	20	Tuberculosis	290	279
Influenza	2	25	Typhoid fever	6	6
Measles	141	404	Undulant fever	9	14
Mumps	78	122	Whooping cough	81	111
Paratyphoid fever	18	9			

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

Plague

Basutoland.—Information dated March 20, 1942, states that an outbreak of suspected plague has been reported near Thaba Bosiu in Maseru District, Basutoland. In two villages there have been 7 cases with 3 deaths. Three other villages in the same area are also affected.

Smallpox

British Guiana.—During the week ended February 28, 1942, 1 case of smallpox with 1 death was reported in British Guiana.

Typhus Fever

Algeria.—For the period March 11–20, 1942, 2,426 cases of typhus fever were reported in Algeria (136 cases in Algiers and 58 cases in Oran).

France—Marseille.—During the period April 7–15, 1942, 50 cases of typhus fever were reported in Marseille, France.

Morocco.—During the week ended April 4, 1942, 1,509 cases of typhus fever were reported in Morocco. In the preceding week 1,544 cases of typhus fever were reported.

Sierra Leone—Freetown.—During the 2 weeks ended January 10, 1942, 1 case of typhus fever was reported in Freetown, Sierra Leone.

Spain.—Typhus fever has been reported in Spain as follows: week ended March 21, 1942, 412 cases (89 in Madrid and 69 in Barcelona); week ended March 14, 326 cases (52 in Madrid and 21 in Barcelona).

Yellow Fever

Gold Coast—Suami.—On March 18, 1942, 1 case of yellow fever with 1 death was reported in Suami, Gold Coast.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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Public Health Reports

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HEALTH AGENCIES—THEIR RESPONSIBILITIES AND THEIR OPPORTUNITIES DURING THE PRESENT CRISIS [1]

By PAUL V. McNUTT, *Administrator, Federal Security Agency*

Last year, when I spoke to this conference, I said that the gravity of the world situation did not permit me to dwell on past accomplishments.

Today this is more emphatically so than it was then. We are now engaged in a "shooting war," and vigorous prosecution of this war must take precedence over everything else. I do not mean prosecution of the war along the civilian or home front, but wherever our troops, ships, or planes are striking at the enemy. In doing their part, health departments, like other civilian agencies, will have to give up personnel for service with the armed forces and on the field of actual combat. While the war is in progress there can be no thought of maintaining present organizations intact.

With such organizations as you can retain or recruit, you will have to discharge your responsibilities along the home front. These responsibilities are indeed numerous and grave. Many new duties are being imposed upon you. With your improvised forces, these duties can be fulfilled only by prodigious effort and possible curtailment of certain activities which are not indispensable to conduct of the war.

One problem which must be attacked immediately and vigorously is industrial hygiene. The world's attention is focussed on the combined man- and machine-power of the United States. On our ability to fabricate and deliver the materials of war are based democracy's best hopes and the enemies' darkest fears. Whatever impedes production diminishes both our hopes and their fears. Any factor which steals the worker's time or saps his energy threatens our national security and gives aid and comfort to the enemy.

Sickness and disability are such factors. The time lost annually to industry through illness and disability is appalling. If this time were spent on the job instead of in the hospital or sick room it would

[1] Presented at the Fortieth Annual Conference of the United States Public Health Service with the State and Territorial Health Officers, Washington, D. C., March 25, 1942.

give us about 165,000 fighting tanks—40,000 more than the President has asked for during *both* the years 1942 and 1943. It would enable us to send down the ways more than 50 new super-dreadnoughts of the *North Carolina* class—a fleet large enough to protect our shores and also clear the sea lanes for any expeditionary forces we chose to dispatch.

The Government has appointed experts to put our supply system on a sound wartime basis. But supplies alone are not enough. Strong, healthy men and women are needed to transform materials into fighting assets. You are the experts to whom the Government looks for sound wartime management of our human resources. The Nation expects you to see that people are fit to take their places at their machines, on the assembly lines, on the farms, and do a faster and more efficient job than ever before. Your primary responsibility, therefore, is to transfer the largest possible proportion of this lost time from the debit to the credit side of the national ledger.

The development of industrial hygiene as a public health activity is one of the many advances in recent years to which you can point. But in view of present crucial needs not enough effort as yet is devoted to this activity. Considerably greater financial outlays must be made by the States themselves. Of the $1,006,000 budgeted for industrial hygiene purposes by State and local agencies during the fiscal year 1942, approximately 64 percent was contributed by the Federal Government and only 36 percent was State and local funds. On this basis the States are not yet doing their share.

Money, however, is not all that is needed. Wisdom, initiative, and sustained effort will be required in greater measure than ever before. By the end of the year we expect 10,000,000 more persons to be engaged in war industry than there were at the end of 1941. Many of these new war workers will have to be drawn from the older age groups, the women of the country, and those whose physical condition leaves much to be desired. The time has come when we should launch a rehabilitation program in order to utilize the potential labor power of the physically handicapped. As the labor supply approaches the depletion point, the only way to step up production will be to increase the efficiency of the individual worker. Yet, longer hours and increased working speed will tax the workers' strength and resistance. Mental stresses and strains will become increasingly severe, especially if the months of struggle stretch into years. Nutrition—the primary factor in physical fitness—may be impaired in case America has to become the granary as well as the arsenal of democracy. To all these growing tasks and problems will be added those pertaining to extra-cantonment health and sanitation, large scale migration of workers, and the complicated duties of civilian defense.

The Public Health Service has rendered substantial aid to the

States in supplying a mobile force of more than 600 emergency health and sanitation workers. These trouble-shooters have been sent into areas where needs are most urgent. But the over-all health task for the Nation will have to be done by State and local people And, as the size and power of our combat forces grow, technical personnel for civilian functions are certain to be even further depleted.

How, then, are you going to manage? As Director of Defense Health and Welfare Services, I have naturally given this question the most serious attention.

In all branches of the Federal Security Agency we have faced the same problem: to see how we can best aid in winning the war. With this end in view, it would seem that health departments have too limited a conception of their possible functions and activities.

The basic importance of health in practically all aspects of civil welfare is universally recogni ed. Accordingly, health agencies have been given broader legislative and statutory authority than almost any other branch of government. They have the right to make and enforce regulations, and to expend public funds. Again and again these rights have been upheld by judicial decisions. Nevertheless, many health departments continue to operate for the most part within the restricted sphere of duties bequeathed them by tradition—imposition of quarantine, routine inspections, and advice on a broad, impersonal basis. Meanwhile the community may be sorely in need of the kind of additional help the health department is peculiarly equipped to give. Hospital facilities and medical care may be grossly inadequate. Faulty industrial hygiene may be robbing the workers of vitality and the country of needed goods. Sanitary codes may be hopelessly outmoded. Better housing may be the urgent health need. Organized vice may be impeding the military effort.

We must realize that business as usual is out. Inertia and solicitude for special interests cannot be tolerated in our health agencies today.

Failure to be more aggressive and to expand activities in conformity with needs cannot in many instances be attributed to lack of funds. Since passage of the Social Security Act in 1935, the Federal Government has been making substantial grants to the States in order to help them finance their health programs. As a result we now have a framework of organization which permits a very wide latitude of operations. Yet, the States for one reason or another fail to develop essential services while unexpended balances of funds accumulate on their books. Reluctance to undertake operating functions is especially inappropriate at this crucial time. What is needed today are operating agencies which will step in and do the most urgent tasks, regardless of tradition and custom.

The task of most immediate importance today may not, however, be the most important tomorrow. Circumstances and needs are con-

stantly and rapidly changing. Under such conditions a high degree of adaptability is demanded.

Suppose a fleet of enemy bombers should one night elude our coastal patrols, appear over our cities, and unload their deadly cargoes on our homes, factories, and offices. Would your communities be prepared? Has your State health department a clearly defined plan in the event of such a catastrophe? Do the health officers and their staffs know who would do what, and how? Who would man the first-aid stations? Who would organize the ambulance and hospital services? How would hospital bills be paid? Is there a blood bank with sufficient plasma? Are there facilities for the emergency treatment of water? These are questions which should be decided now. If they are not decided now, confusion, recrimination, and an awful sense of responsibility for lives needlessly lost may be the result.

The point I wish to make is this—in the development of the civilian defense program, the Office of Civilian Defense looks to existing agencies for actual operation. Have your State and local health departments come forward and assumed their rightful dynamic roles in the program?

The part played by health agencies in the community facilities program has left much to be desired. The health departments were in a position to give material assistance to the Federal agencies in planning and implementing this program. Many of them, however, remained cautiously on the sidelines, while others showed themselves to be activated more by special pleading than by true civic needs. In some cases the Public Health Service has had to go contrary to State health department policy and recommendations in order to inject an element of reason into the facilities work.

Teamwork and cooperation are today nothing less than matters of national salvation. There is not time for each of us to work out his own problems in his own way. It is for this reason that the Office of Defense Health and Welfare Services has been established as a coordinating agency. We cannot place too much stress upon the necessity for constant and close cooperation between State health authorities and the regional offices of the Office of Defense Health and Welfare Services. State health agencies might well follow the example of the Public Health Service, whose cooperative relationships with other agencies have been developed to a remarkably high degree.

As an administrator, I hold no brief for the creation of new agencies for their own sake. I believe it is sound public administration to work through the fewest agencies possible. If, however, there is an urgent task to do, and no old-line agency is willing or prepared to do it, the only alternative is to set up a new agency. Behind the recent multiplication of governmental agencies is a long history of official com-

placency and neglected opportunity. I believe there are many lessons in this history which existing health agencies might well consider, and in the light of which they might reconstruct their basic philosophies.

It would appear that health departments are sometimes too easily discouraged when confronted by administrative difficulties. One problem now causing much trouble is inability to get personnel which meet merit-system requirements. I admit this has some vexing aspects, but I wonder just how far health departments have gone in trying to work out feasible plans for temporary relief in cooperation with their merit-system administrative bodies.

Then there are legal stumbling blocks. Not infrequently a health agency wants to undertake a new activity, but finds itself faced with a defect in the law. This should not be an insurmountable obstacle, but in practice it is often regarded as such. We live in a democracy and are privileged to try to get rid of a bad law or pass a good one whenever we see fit. Frequently, however, we do not try, and if we do we do not try soon enough. The objectionable features of a law are often not discovered until the need for action is urgent. I believe every health department should periodically review the legal code and initiate revisions that seem desirable in the light of current or anticipated needs.

I would also have you consider in its broader aspects the implications of the increasing financial dependence of the States upon the Federal Government. The purpose of the Federal grants-in-aid is to encourage and assist the States to meet their problems, and to equalize burdens imposed by factors not always subject to State or local control. It was never the intention to relieve the States of their financial responsibilities, nor to extend assistance beyond the amounts which the States might reasonably be expected to meet. Nevertheless, there is an unfortunate tendency to let Uncle Sam shoulder as large a part of the load as possible.

Such a policy is extremely short-sighted for two main reasons. First, it amounts to virtual abdication of State and local autonomy. The present emergency gives a broad national significance to the health problems of each individual State and community. Unless local authorities attack these problems aggressively, and unless they contribute materially to the cost of doing so, they are likely to find that certain essential activities will pass into the hands of those who assume the required initiative.

The second reason is even more important than the first. It is simply a matter of patriotism. At no time in history has the burden on the Federal Treasury even approached its present proportions. And never before has the manner in which Federal funds are expended been so replete with life-and-death significance in the most literal sense.

So far I have spoken mainly about the responsibilities of health agencies. But if the present crisis entails many added responsibilities it also presents some rare opportunities. Under the impetus of war many worth while and long overdue enterprises have been undertaken. Thanks largely to the Public Health Service emergency program, many communities are for the first time experiencing the benefits of full-time public health organization. Thus, the spade work—the most difficult part of the task—has been done, and the way is prepared for the States to carry on permanently. Likewise, the community facilities program is providing first-rate hospitals, health centers, and sanitary installations without which health departments have long been seriously handicapped. The war has aroused people to a new sense of civic duty which can be directed into many useful channels. A spirit of teamwork, unity, and self-sacrifice is manifest throughout the land. Consider the opportunity for health education presented, for example, by the 8,000 local civilian defense organizations with more than 5,000,000 volunteer members! These groups may not remain intact if they are to concern themselves solely with the effects of direct enemy action against their towns. If the air raids which had to be anticipated do not occur, will these organizations be permitted to waste away simply because their programs lack immediately applicable content? If so, health departments will have missed an unprecedented chance for instructing the public and enlisting its support.

I am not unmindful of the great advances in public health achieved in recent years nor of the truly splendid work the official health agencies have done in bringing about these advances. It is precisely because of the effective work you and your predecessors have done that many of the traditional public health problems are no longer of primary concern.

But today new problems have arisen. Upon the way you accept and meet their challenge depends the strength and staying power of America's fighting, toiling millions. You must not let them down.

The struggle into which we are now plunged can have but one of two endings. Either we will join those unfortunate countries who have already been beaten, humiliated, and brutalized or we will continue to hold our heads high in a world of free men and self-governing nations.

Today the decision rests with us—of that I am sure. Tomorrow the power to decide may have passed out of our hands.

When you go back to your home States, I urge you to review your health programs carefully. Weigh every shortcoming and ask yourselves how it affects the progress of the war. Analyze every deficiency and ask what implications it holds for the future of the country you love.

Then, together with your lieutenants, put your commands on a war footing. Map out a strategy of attack and clear the decks for action.

Then, when your course is charted, let Farragut's order be your watchword: "Full speed ahead and damn the torpedoes!"

OPENING REMARKS TO THE FORTIETH ANNUAL CONFERENCE OF THE UNITED STATES PUBLIC HEALTH SERVICE WITH THE CONFERENCE OF STATE AND TERRITORIAL HEALTH OFFICERS [1]

By THOMAS PARRAN, *Surgeon General, United States Public Health Service*

In the 11 months since this Conference last met, many important events have occurred. The impact of war has been felt by every person in the country, and this impact in the future will be increasingly severe. Many major readjustments will have to be made. There will be added demands on everyone in the country, particularly upon the State and local health organizations.

It is gratifying to report that so far in this emergency there has been no significant increase in disease and death rates. There was a sharp rise in the prevalence of influenza last winter, but though it caused some concern it did not result in any considerable increase in the mortality rate. During the current winter the communicable disease rates have been lower than the median levels of the previous 5-year period.

This good record has been maintained in spite of the major dislocations which have occurred as a result of mobilization and, later, of war. I know you feel that this is a real tribute to the efficiency of the public health organization in this country.

An exception to the currently favorable communicable disease situation, however, must be noted with regard to the venereal disease statistics. Through routine serological tests made on all selectees and volunteers, we have found many new cases of syphilis and gonorrhea, but too few of these cases have been brought under treatment. Generally speaking, the States with the highest rates as shown by selective service examinations have had the least effective control organizations. While it is true that venereal disease rates in the armed forces are lower than in the last war, in my opinion they are not low enough. Somewhat disturbing is the increase in the rates of syphilis and gonorrhea in the Army between 1939 and 1941. As you know, very effective treatment measures have been developed against the venereal diseases, and this improvement should have been reflected in a lower incidence than we now have. One reason for the increase

[1] Washington, D. C., March 25, 1942.

has been the growth of commercialized prostitution incident to mobilization for war. In many places the health agencies have not assumed leadership in persuading the police authorities to take firm repressive action Moreover, we have been disappointed at the failure of many communities to seek aggressively to provide adequate quarantine and detention facilities for recalcitrant venereal disease patients. This matter is the subject of a letter which has just been sent to you, urging that you sponsor more aggressively than in the past facilities for the care of these patients.

I should like to call your attention also to the substantial aid you are able to secure from the liaison officers of the Public Health Service who are assigned to each of the Army Corps Area headquarters. I urge you to make the fullest possible use of these officers in coordinating military and civilian venereal disease control efforts.

You will recall that at the Special Conference with the State health officers held in September 1940, a comprehensive program for the rehabilitation of physically disabled selectees was recommended. Unfortunately, this program is still in the planning and trial stage. Nothing substantial has been done to rehabilitate the very large number of men found by selective service examinations to be disabled I hope that each of you in your own State will do what you can to speed this important work.

We shall need to give serious attention to personnel problems. I know how severe has been the impact of mobilization in depleting the ranks of State and local health agencies of their trained personnel. To meet this situation, as you know, a Procurement and Assignment Service has been established. This organization has as its primary purpose the securing of adequate numbers of officers for the Army and Navy, with the least possible disruption of essential civilian health and medical services. The detailed operation of the organization will be described to you later in our session by one of its representatives. A circular is now in the mails requesting all State health officers to list with the State Director of the Procurement and Assignment Service the names of the key personnel who cannot be spared from their present tasks.

In order to meet personnel problems, it has been necessary to alter the administration of the merit system in several ways. This obviously is necessary, in my opinion. In fact, as time goes on it will be necessary to make more and more changes with regard to diluting staffs, improvising methods, reducing the less essential activities, and using volunteer and other kinds of help which we can get to do the necessary jobs.

I have been concerned with the continued indisposition on the part of some States to look beyond the State boundaries for trained personnel. A communication recently received from an eminent teacher

of public health says, "I look with the gravest concern upon the continued trend toward balkanizing public health in this country."

In an effort to help you with your personnel problems the Public Health Service has recruited more than 600 professional health workers. These persons have been assigned to various parts of the country in an attempt to meet the most urgent needs. I can say that in recruiting this personnel last autumn we scraped the bottom of the barrel rather clean. Nevertheless, in connection with a recent examination for the regular corps of the Public Health Service, we had applications from between 150 and 200 extremely well-qualified young doctors. These men have not had training in public health, but basically they are much better qualified than any previous group of applicants.

Our present funds do not, however, permit us to continue to employ additional reserve personnel for assignment in the States unless the States themselves see fit to transfer to their own pay rolls some of the persons whom we are now carrying. Many of the positions in which our personnel are serving are normally State or local positions which are vacant because of the war. I would ask your utmost cooperation in utilizing unexpended funds—funds which otherwise would lapse—to transfer these workers to the State pay rolls in order to enable us to recruit additional personnel and send them to you.

You are aware, I am sure, of the serious shortage of nurses, present and impending. In an effort to remedy this shortage, Congress has appropriated $1,800,000 which is this year being allotted by the Public Health Service to nursing schools in accordance with rather well established formulae to enable the nursing schools to increase the number of nurses in training. The cost has approximated $300 per student nurse per year. This program, however, will provide only a small proportion of the total number of nurses needed. It will be necessary also to recruit nurses' aides and less well trained personnel who can carry on some of the more routine nursing tasks.

Much of the time of the Public Health Service staff during the past year has been expended on the problem of community facilities. These facilities, provided in whole or in part by Federal funds, are not intended to make up for years of neglect on the part of the communities, but rather to meet the additional demands caused by the war.

Prior to March 16, the total number of water supply projects, sewer systems, hospitals, and health centers which have been approved by the President is 536, at a total estimated cost of $122,000,000. The number of projects approved, however, is only about one-third of the total number requested. Sixteen hundred applications have been received asking for aid in connection with health and sanitation projects.

Moreover, because of the shortage of critical materials it is not possible to construct hospitals in accordance with previously accepted standards Partly as a result of the unavailability of critical materials, a more functional type of construction is being utilized. This is a development which is therefore not without a certain element of benefit.

I have been concerned because, with the increased availability of Federal funds for certain purposes, the States seem to have a tendency to depend more and more on the Federal Government for aid. I think that more substantial State and local contributions are in order in many phases of public health. This is particularly true of industrial hygiene, a field in which a very large proportion of the cost is being met with Federal funds. Needless to say, this is one of the most important activities related to the war.

I regret to report that scarcity of relief labor makes it impossible to continue the WPA community sanitation projects during the ensuing year. Yet it is just as important to provide sanitary installations in many defense areas not suitable for sewer systems as it is to provide water and sewerage facilities for the more densely populated sections. A recent ruling by the Budget Bureau would make the operation of community sanitation projects extremely difficult if not impossible under the Community Facilities Act. Unless this ruling can be modified we may be forced to seek a special appropriation to carry on such projects in defense areas.

Those States which had malaria control programs last year are aware that they were not very successful, due largely to unavailability of WPA labor. During the ensuing year the Public Health Service will have a more direct responsibility in this work. The Service is now authorized to employ labor for the larvicidal program in defense areas. Pest-mosquito or salt-marsh mosquito control will not be carried out under this program. I ask your cooperation in the malaria control program now under way in the defense areas, and your interest and direct action in the nondefense areas where similar measures of control are needed.

Almost every year I bring up the question of unexpended State balances of title VI and Venereal Disease Control Act funds. Some of my colleagues have expressed an opinion that perhaps your fiscal control is not prompt enough to keep you aware of such balances. It is obvious that there are many urgent health needs which should be met, and if funds are available it has been inexplicable to us why the needs have not been met. I recognize that shortage of personnel is of growing concern. This accounts for some of the lag between the appropriation of Federal money and its utilization.

Another problem which has been of concern to many of us, perhaps to all of us, is that of more prompt provision of delayed birth certifi-

cates. This matter is of acute interest to the War Department and to the War Production Board. In fact, so serious is it that several bills have been introduced into Congress which would nationalize certain major aspects of the vital statistics function. This is a matter which I know will be of much concern to you as State health officers. For some reason, we have not been able to impress upon the fiscal authorities the need for additional funds to do this job. They have pointed out the consideration which I have just mentioned, namely, that there are unexpended balances available in many States which could be diverted to this emergency task.

It is inevitable that war will bring you many additional problems. One problem which has been prominently before us is the organization of the Emergency Medical Service. As you know, the Public Health Service has cooperated with the Office of Civilian Defense from the beginning in the organization of the Emergency Medical Service. The administrative aspects of the work have been handled by the OCD, and matters of general medical policy and professional standing have been in the hands of the Public Health Service. Recently a joint arrangement or agreement has been made between the Office of Civilian Defense and the Federal Security Agency under which the various responsibilities of the Public Health Service and the Medical Division of the OCD have been clearly defined. Moreover, in order to meet emergencies arising from enemy action, the President has allotted to the Administrator of the Federal Security Agency some five million dollars, of which a half-million have been made available to the Public Health Service for payment of emergency medical and hospital bills incurred by persons affected by enemy action. Already some parts of this fund have been spent in connection with evacuees from Hawaii and Alaska, and on behalf of injured sailors and other persons on both coasts.

It has been necessary for the Public Health Service substantially to increase its reserve corps. We shall have two categories of reserve officers on inactive duty. With one of these you are familiar, that is, State or local health personnel who are given commissions with the understanding that they will be available for active duty in the event of an epidemic or other serious emergency. Another group of approximately 2,000 will be commissioned in the near future as an Emergency Medical Service reserve available to man emergency base hospitals and to take care of evacuees in reception areas. Dr. George Baehr, Chief Medical Officer of the Office of Civilian Defense, will discuss this problem in more detail with you.

War will bring us many shortages. It is inevitable that there will be rationing of many things. Rationing on the food front may have to be extended. The advice of medical and health authorities will be

an important factor in assuring that systems of rationing do not impair the health and strength of the population.

It is difficult to know what all of our problems during this next year will be. We need to keep an open mind and an effectual organization to meet emergencies as they develop. In fact, today the health agencies of the country face their supreme test, that of adapting themselves to a much broader purpose than that for which they were organized. This purpose is not only to help decide the national destiny, but, we may even say, to aid in shaping the future pattern of our human institutions.

STATE AND TERRITORIAL HEALTH OFFICERS CONFER ON WARTIME TASKS

The Fortieth Annual Conference of the United States Public Health Service with the State and Territorial Health Officers was held in Washington, D. C., on March 25 and 26, 1942.

The Conference was devoted almost entirely to consideration of wartime tasks and duties. Throughout the sessions a strong note of determination to make the health services of the country contribute most effectively to success in the war was apparent. Most of the recommendations of the Conference were directed to this end.

The opening remarks of Surgeon General Parran and Administrator McNutt's address, "Health Agencies—Their Responsibilities and Their Opportunities During the Present Crisis," are printed in full in this issue.

STATUS OF LEGISLATION AND APPROPRIATIONS

Assistant Surgeon General E. R. Coffey discussed legislative measures and appropriations pertaining to public health.

Two of the more important measures which have become law since the last Conference are H. R. 2475, introduced by Mr. May, of Kentucky, prohibiting prostitution within such reasonable distance of military and naval establishments as the Secretaries of War and Navy shall determine; and H. R. 4545, introduced by Mr. Lanham of Texas, authorizing expenditure of $150,000,000 for defense public works. The authorization was made effective by Public Law 150, appropriating this sum. Subsequently, Public Law 371 appropriated an additional $150,000,000 for the same purpose.

Of the bills introduced since the last Conference but not yet enacted, the following are the most important:

H. R. 70, H. R. 3463, H. R. 3492, H. R. 3968, and S. 195, providing for Federal aid in the control of tuberculosis.

S. J. Res. 104, establishing an Encephalitis Control Board and appropriating $3,000,000 for encephalitis control. The bill passed the Senate on August 21, 1941.

H. R. 1007, amending the National Cancer Institute Act and providing Federal aid in cancer control.

S. 194, authorizing the Surgeon General to conduct, foster, and coordinate research relating to the cause, diagnosis, and treatment of dental diseases, and authorizing the necessary funds. The bill passed the Senate on May 23, 1941.

S. 489, adding a new title to the Social Security Act providing for health insurance under State plans.

H. R. 1791, establishing a new executive department to be known as the Department of Health.

S. 2999, providing that the Director of the Census shall issue certified birth records to persons furnishing proof of birth within a State or the District of Columbia. Seven other bills on this subject have been introduced.

H. R. 1110, H. R. 3778, H. R. 4106, H. R. 5676, S. 1121, and S. 1913, all establishing a Division of Water Pollution Control in the Public Health Service.

H. R. 584 and S. 1230, providing for promotion of the general welfare through the construction of needed hospitals.

S. 193, authorizing Federal aid to States having approved prevention and compensation plans relative to dust diseases.

S. 509, providing for Federal aid to States with approved plans for promoting industrial hygiene.

H. R. 1074, authorizing Federal aid to States for the purpose of promoting physical education and recreation through schools and school camps.

S. 797, creating a National Physical Fitness Institute in the Federal Security Agency.

The following appropriation bills have been enacted:

Public Law 9, approved March 1, 1941, appropriates $525,000 for emergency health and sanitation activities in connection with defense.

Public Law 146, approved July 1, 1941, appropriates $35,480,700 for the Public Health Service during the fiscal year 1942. Of this amount, $565,000 is for cancer control activities, $11,000,000 is for grants to States under title VI of the Social Security Act, $6,250,000 is for venereal disease control activities, $1,235,000 is for emergency health and sanitation activities in connection with defense, and $1,200,000 is for training of nurses as a defense measure

Public Law 150, approved July 3, 1941, appropriates an additional $1,940,000 for emergency health and sanitation activities pertaining to defense.

Public Law 463, approved February 21, 1942, provides additional amounts of $2,500,000 for venereal disease control, $77,481 for disease and sanitation investigations, $1,295,000 for emergency health and sanitation defense activities, and $600,000 for defense nurse training.

EMERGENCY MEDICAL SERVICES

Dr. George Baehr, chief medical officer, Office of Civilian Defense, addressed the Conference on the "Role of State and Local Health Officers in Emergency Medical Service."

Dr. Baehr outlined the organization of the OCD's Emergency Medical Service which was established to safeguard the population against the results of direct enemy action. The Service is organized on a regional, State, and local basis. The national, regional, and State organizations are planning and advisory agencies; operations are performed by the local organizations. Experience has shown that a full-time director or deputy director is necessary at the State level in order to organize local resources for effective action.

Local organizations are responsible for the operation of field cas-

ualty services which should be carefully coordinated with the casualty receiving hospitals. Hospitals receiving casualties will be reimbursed at a rate of $3.75 per day per patient.

Emergency base hospitals must be established in strategic locations to receive patients from the casualty receiving hospitals as well as from other hospitals which may be evacuated by military order. These hospitals also will receive per diem reimbursement of $3.75 per patient. In addition to existing and affiliated staffs in institutions selected as emergency base hospitals, physicians in the various specialties will be enrolled in the reserve corps of the Public Health Service and placed on full-time duty at the base hospitals. Provision has also been made for part-time medical consultants to serve at such hospitals. The Federal Government will assist in a measure in providing equipment for field casualty stations and hospitals but delivery of equipment cannot be promised at any specific date. States and localities are urged to secure equipment themselves without delay.

Larger hospitals in target areas will be assisted in the establishment of blood banks. Regional consultants who are expert in this field will be designated to assist these hospitals. The National Research Council has prepared a technical manual on the organization and operation of blood banks. Hospitals which are aided financially in the development of banks will be expected to accumulate, in addition to their current needs of blood and plasma, a reserve of not less than 250 cc. of plasma per bed within the next 2 or 3 months. This plasma may be preserved in either liquid or frozen state. An additional reserve of about 50,000 units of dried plasma is being set up for use in case local reserves should be exhausted.

Discussion of Dr. Baehr's remarks brought out the fact that State health officers could aid in choosing hospitals which were so located that they should have plasma banks and which were eligible for assistance in establishing such banks. Large reserves of plasma are not being accumulated because of technical developments which may reveal other forms of blood substitutes to be satisfactory. In order not to interfere with the Red Cross campaign of blood collection for the armed forces, blood should be obtained through expansion of an existing Red Cross collection station or through establishment of a new collection center in a locality which will not interfere with the Red Cross effort.

At the request of Dr. Baehr, Dr. Dean A. Clark, Chief of the Emergency Medical Section of the Public Health Service, described the Service's program for immediate care of seamen and others from vessels sunk near our coasts by enemy action, as well as of persons evacuated from Hawaii, Alaska, and other danger areas. Under an allotment from the President's emergency fund, the Service defrays physicians', hospital, and burial costs for casualties of this type. Bulletins have been issued giving reimbursement schedules and other details.

The afternoon of March 25 was devoted to the meetings and deliberations of the Conference committees.

The session on March 26 opened with an address, "Are We Meeting the Crisis?" by Assistant Surgeon General Joseph W. Mountin.

ACCOMPLISHMENTS AND SHORTCOMINGS

Dr. Mountin cited the Public Health Service reconnaissance surveys undertaken in approximately 300 communities to evaluate existing health and sanitation facilities and determine war-connected needs. Some progress has been made in meeting these needs. Full-time local health service has been extended to 106 more counties than had such service on June 30, 1941. On March 21, 1942, 565 health and sanitation projects involving a total estimated cost of more than $132,000,000 had been approved for construction under the Community Facilities Act. Approximately 630 physicians, engineers, nurses, and other specialists have been recruited by the Public Health Service and sent to State and local health departments for duty in defense areas. Another group of about 75 will be assigned in May. The States have been assisted in the prosecution of malaria control and community sanitation projects under the Work Projects Administration. Plague and typhus fever control activities have been expanded. It is impossible to measure exactly the results of all these accomplishments in terms of disease incidence, but we do know that in a period of abnormal strains and disruption no unusual amount of illness has occurred.

Nevertheless, certain shortcomings have been apparent, and more aggressive action along many lines is clearly indicated. Prevailing rates of venereal disease among the armed forces show the need for stricter law enforcement and better control programs, including facilities for the detention and treatment of infected prostitutes. Acute personnel shortages, present and impending, make it necessary for health departments to "dilute" their staffs with substandard personnel. New tasks require a more flexible interpretation of health department functions. So far, the States have shown little or no disposition to transfer to their own pay rolls the emergency personnel assigned to them by the Public Health Service; this the States should do in order that Public Health Service funds may be utilized in recruiting new personnel.

The malaria control and community sanitation programs during the past year were severely handicapped by inability to secure relief labor. During the ensuing year the Public Health Service will operate the malaria control program in defense areas with labor hired in the open market, and a more successful program is anticipated. Negotiations looking toward improved organization of the community sanitation projects have been undertaken.

The failure of State health departments during the past year to carry out successfully the work of delayed birth registration indicates the need for simplifying and accelerating the process, and for certain changes in the basic law in a few States.

The present crisis makes it imperative for health departments to broaden the scope of their activities, to assume leadership in getting necessary things done without fear of offending special groups or interests, and to adopt a flexibility of approach consistent with rapidly shifting needs.

Discussion of Dr. Mountin's address centered chiefly about the subject of "lend-lease" personnel. There was general agreement that the recruiting program had been highly successful and that the personnel recruited had done good work. Certain considerations were cited which made the transfer of personnel to State pay rolls difficult, the chief ones being civil service regulations and disparity in salary rates. It was made clear that personnel now paid by Federal funds for duty in defense areas could be employed in nondefense areas if transferred to the State pay roll.

PROCUREMENT AND ASSIGNMENT SERVICE

The next discussion was led by Lt. Col. Sam F. Seeley, Executive Director of the Procurement and Assignment Service, Federal Security Agency. Colonel Seeley outlined the history of organization of the Service, which was established to procure an adequate number of physicians, dentists, and veterinarians for the armed forces with the least possible disruption of civilian health services.

Utilizing the data already gathered by professional societies concerning the availability of professional personnel for military service, the Procurement and Assignment Service is setting up its central information and control mechanism in Washington. In each of the nine Army Corps Areas an advisory committee has been appointed consisting of representatives of hospitals, medical colleges, and the various professional associations. In each State a chairman of Procurement and Assignment Service has been named to set up and maintain a roster of all practitioners within the State.

When the information gathered concerning practitioners everywhere in the country is compiled in a national roster, the Procurement and Assignment Service will, by means of coding and punch card machine procedures, be able to fill requisitions of the armed forces and other government agencies for any specified types of practitioners. Practitioners claiming to be specialists are rat l as to qualifications by outstanding specialists and by the boards of specialties in the various fields of practice. Before a practitioner will be commissioned or employed by the government services, however, he must be certified as "available" by the Procurement and Assignment Service. In this

way it is intended to prevent the induction of men necessary to the maintenance of civilian health.

State health officers have been asked to draw up a list of persons essential to the maintenance of public health. Such men may be commissioned as reserve officers in the Public Health Service. The list of essential personnel must be maintained currently and the State chairman of the Procurement and Assignment Service must be notified of all changes. Criteria for use in determining who is "essential" will be sent to State health officers. Essential personnel will be certified to the armed forces and Selective Service for deferment by the Procurement and Assignment Service, and deferments will be granted as long as the needs of the Army and Navy are met.

Physical requirements for active service have been lowered since the outbreak of war. Medical officers with certain physical handicaps may now serve in the "zone of the interior." For this reason, all men under 45 should be considered as eventually available for military service, and arrangements should be made to replace them with men over 45, women practitioners, and others definitely not qualified for military service.

In answer to questions after his remarks, Colonel Seeley stated that it was planned to utilize women physicians wherever they could relieve men, particularly in hospitals, teaching institutions, and civilian defense activities. He said that the Procurement and Assignment Service was not organized to handle the procurement and assignment of engineers or nurses. He also stated that commissions were granted on the basis of age and professional or military experience, but that the higher commissions, of which there were a limited number, must necessarily be filled chiefly from men already in service rather than from men newly inducted. As far as the Army and Navy are concerned, it is a physician's basic medical training which will be utilized most of the time during service; a physician cannot, therefore, expect to practice his specialty except under circumstances in which special skill may be called for.

THE PUBLIC HEALTH SERVICE RESERVE

Assistant to the Surgeon General Warren F. Draper outlined the history and organization of the reserve corps of the Public Health Service. He read correspondence with Selective Service Director General Hershey, indicating that Public Health Service reserve officers were not exempt from registration, training, and service under the Selective Service Act, but that Selective Service was not unmindful of the importance of the reserve and that this fact would be considered by local boards in making classifications.

In order to have trained personnel available for wartime emergency duty, the Service is granting inactive reserve commissions to qualified

public health personnel (physicians, engineers, and dentists) who will be called to temporary active duty when and where needed upon request by the State health officer to the Surgeon General. Salary and travel will be paid by the Service.

State health officers have been requested by the Surgeon General to recommend personnel for such reserve commissions. It is expected that approximately 2,000 persons will be needed to meet possible needs.

With the assistance of the Office of Civilian Defense, the Service is also recruiting for inactive reserve commissioned status, approximately 2,000 physicians who will be available for temporary active duty in emergency base hospitals, or in case of any emergency requiring the services of Public Health Service physicians.

Discussion of Dr. Draper's remarks revealed that the rank granted to reserve officers would be dependent upon age, qualifications, and ratio of reserve officers to regular officers. Pay and allowances will be equal to those of medical officers in the Army. Physical requirements ordinarily in force are being waived, the criterion being ability to do the task required. No definite upper age limit has been established.

The question of whether or not men in the inactive reserve might be allowed to wear uniforms was raised. Dr. Draper indicated that this was not possible under existing regulations. When called to active duty reserve officers can, and must, wear the uniform.

Reports of Conference Committees

At the afternoon session on March 26 the reports of the six committees of the Conference were presented. After discussion by the members, the reports were adopted in the form indicated in the following abstracts. The full reports of the committees will be included in the Proceedings of the Conference.

COMMITTEE ON INTERSTATE AND FOREIGN QUARANTINE

Section I of the committee's report deals with interstate quarantine, and recommends:

1. That, in States where the health department does not have authority to create and operate health districts to cope with emergency health problems, consideration be given to the provision of legislative authority for such action, including authority to unite two or more existing health units. A suggested form of a legislative bill for this purpose is being formulated by the Federal Security Agency, and will be available soon.
2. That activities for control of plague and typhus fever be continued and expanded.
3. That the Public Health Service be authorized to supply technical guidance for malaria control programs in nondefense areas where such programs are deemed essential for protection of the public health.

4. That consideration be given to extension of the use of yellow fever vaccines to sections of the civilian population which may be exposed to infection.

Section II of the report deals with foreign quarantine, and recommends:

1. The maintenance of a high state of efficiency in the foreign quarantine service in order to cope with the increasing hazards of importation of infectious diseases.
2. Provision in advance for control of refugees and immigrants at points of debarkation. While such control is not now urgent, it will be when conditions permit increased immigration.
3. Consideration of problems of sanitation and communicable disease control which may arise as a result of the importation of prisoners of war and the establishment of internment camps.

COMMITTEE ON HEALTH PROGRAMS

The committee emphasized the necessity for conservation of human resources as a war measure. Towards this end it made the following recommendations:

1. That the public give increased attention to personal health and to the correction of existing physical defects while medical services are still available; and that the medical, dental, and nursing professions give more intensive thought to the preventive aspects of their work.
2. That all media for mass public health education be utilized; that State health department programs of health education be strengthened; that local health education programs be stimulated; and that technical and advisory facilities of the Public Health Service with regard to health education continue to be made available to the States.
3. That in view of a probable war-engendered increase in the incidence of tuberculosis, present control measures be maintained and expanded; that additional facilities for early case finding and care be made available; that State health departments insure that cases discovered by Selective Service examinations be reported to them, followed up, and given appropriate treatment; and that the Surgeon General of the Public Health Service take steps to secure the cooperation of Selective Service boards and Army medical authorities in prompt and complete reporting of tuberculosis cases.
4. That more adequate home nursing services be made available in order to lessen the strain on hospital facilities; that the programs of all public and private agencies employing public health nurses be coordinated and their resources pooled.
5. That it is a proper function of State and local health authorities to assist in the establishment and operation of wartime emergency medical services.
6. That State health departments take steps to increase the efficiency of their vital statistics bureaus so as to perform more expeditiously the work of delayed birth registration; that Federal funds be granted to the States for this purpose.
7. That outbreaks of Vincent's infection be reported to the Public Health Service.
8. That State health departments place more emphasis on programs for dental care and industrial hygiene.
9. That the State health departments assist the Public Health Service in prosecuting its malaria control program.

10. That the Public Health Service seek an appropriation to enable it to carry out a community sanitation program; that the States assist in such a program if it is instituted.

11. That the Public Health Service be encouraged to expand its program of recruiting and supplying emergency health and sanitation personnel; that, to this end, State and local health departments, wherever possible, transfer such personnel temporarily or permanently to their own staffs.

COMMITTEE ON PERSONNEL

This committee submitted its report in two sections.

Section I deals with the qualifications of 19 classes of public health personnel. These qualifications will later be published in a booklet together with information concerning training of personnel financed by title VI and Venereal Disease Control Act funds.

Section II contains seven recommendations:

1. Establishment by State health agencies of interim classes for professional personnel with minimum qualifications which will permit recruitment of personnel with lower qualifications than would be desirable under normal conditions.
2. Listing by the Committee on Public Health, Procurement and Assignment Service, of physicians engaged in part-time or full-time public health work who might not be qualified for active military service but who might be qualified to perform certain services in State health departments.
3. That the Army be requested to consider the granting of provisional commissions in the Sanitary Corps to undergraduates in approved schools of engineering who are preparing especially for careers in public health or sanitary engineering.
4. That State health agencies increase the enrollment of trainees in university schools of public health through the use of available Federal funds; and that public health scholarships in approved schools be established through individual State health agencies for the purpose of enabling undergraduates in medical schools to pursue training in public health after graduation in medicine.
5. That the normal courses for the "M. P. H.," "Dr. P. H.," and equivalent degrees be continued by university schools of public health on approximately the present basis.
6. That university schools of public health offer short courses in appropriate specialized fields as may be required by military or civilian emergency needs, with or without academic credit, depending on the circumstances.
7. That State health departments establish brief apprentice or orientation courses in the more general fields of public health.

COMMITTEE ON BUSINESS MANAGEMENT

This report was submitted as a joint report of the Committee on Business Management and the Committee on Records, Reports, and Administrative Practices of the Conference of State and Provincial Health Authorities.

The report states that satisfactory progress has been made toward development of a joint budget form for use by the Public Health Service and the United States Children's Bureau, and that the new form may be adopted for use during the fiscal year beginning July 1, 1943.

The report cites the need for a simplification of budgetary proce-

dures, and makes the following recommendations, to become effective July 1, 1942:

1. Eliminate the line item control now required in budget revisions.
2. Substitute for the present budget revision document a simple notification letter for changes involving addition of new activities, discontinuance of projects, and transfers of more than $100 between personal services and other items of expense.
3. Permit States to use lapsed salaries or other salary items without prior authorization by the Public Health Service, provided the States submit, at the end of the quarter, a list of the positions established or abolished during the quarter.
4. Eliminate the detailed quarterly financial report and substitute a quarterly summary of individual project totals for all funds.
5. Establish an annual detailed financial report reflecting all items of expenditure for all projects.

In view of the increased fiscal responsibility placed upon the Public Health Service by the above changes in procedure, the report recommends that none of the changes shall be effected in any State whose accounting, purchasing, property, and personnel controls are not found to be adequate by the Public Health Service.

The report further recommends the extension to other States of a plan, adopted experimentally in one State during the past year, whereby a proportionate charge-off is made of all expenditures in accordance with the contribution of each agency to the total of the individual project.

Another recommendation is that for the duration of the war the States report weekly to the Public Health Service certain diseases which might become epidemic under wartime conditions.

Recognizing that time devoted to preparing detailed reports may often be more profitably spent in extending health services directly to the individual, the committee recommends three basic types of reports for submission by the States to the Public Health Service and the Children's Bureau:

1. An annual report of facilities, services, and personnel in each county.
2. An annual report of health department activities for the State as a whole.
3. A combined annual narrative report and plan which will be kept cumulatively and which will not have to be repeated from year to year.

The committee endorses the principle of State responsibility for actual operation of programs and Federal responsibility for providing financial assistance, consultative service, and audit control. While recognizing that the heads of Federal agencies must determine what information is essential, it recommends that the Federal agencies as soon as possible make their reporting requirements consistent with the principles advanced by the committee.

In conclusion, the report asserts that each State should take a more active part in impressing upon its representatives in Congress the

benefits resulting from the continuation of well-planned public health programs.

COMMITTEE ON FEDERAL-STATE RELATIONS

The report recommends that the allotment formula governing grants to States be continued in its present form insofar as it refers to the amount to be appropriated by the Congress and the amount remaining unpaid to the States at the end of a fiscal year. As an equalizing factor, however, it recommends that the basic allotments, as determined by the allotment formula, be increased or decreased so as to effect a distribution to each State of a proportionate share of the total unexpended balances in all of the State treasuries.

The report also recommends that the Surgeon General's rules and regulations governing payments to States be revised so as to embody the following general principles:

(a) Addition of a new section providing for the formulation by each State of the objectives to be achieved under its program.

(b) Quarterly payments which will provide for operating programs plus a contingent reserve.

(c) Clarification of provisions for withholding payments in the event of violation of budget provisions or failure to develop and maintain a standard of public health commensurate with available resources.

(d) Development of basic rules and regulations which will remain in force from year to year subject to modification through amendment rather than through reformulation of the entire regulations.

A further recommendation is that budget revision procedures be minimized and simplified.

The committee recommends that the States take all necessary steps to insure effective cooperation with the Public Health Service in the conduct of its malaria control program in defense areas.

COMMITTEE ON VENEREAL DISEASE CONTROL

This committee submitted its report in six sections.

Section I calls attention to the increasing shortage of medical and nursing personnel for control activities, which has resulted in failure in many places to follow up cases of venereal disease uncovered by Selective Service examinations, and in neglect of treatment for contacts of such selectees. It recommends the employment for the duration of the war of such keen, industrious, and intelligent persons without technical training in public health as might be available for follow-up work under competent supervision.

Section II recommends that the Surgeon General continue for the duration of the war the policy of employing medical and other personnel to serve on a loan basis with State and local health departments in their venereal disease control programs.

Section III approves the "Recommendations for a Venereal Disease Control Program in State and Local Health Departments" made by the Advisory Committee to the Public Health Service and published in The Journal of the American Medical Association, June 7, 1941.

Section IV recognizes the policy adopted by the Surgeon General of not requiring that State or local funds be made available as matching credits to obtain that part of the Venereal Disease Control Act allotment which is made for war needs. It recommends that State health officers do everything possible to develop matching credits for venereal disease control funds within their respective States even though such matching credits are not at present required on so high a level as before the war.

Section V recommends that the rules established in the past with regard to the allotment and payment of funds provided under the Venereal Disease Control Act be continued throughout the fiscal year 1943, but that, in view of war needs, changes may be made in the proportion of funds allotted to States, subject to the amounts appropriated for this purpose by Congress. Such changes shall be made only after consultation with the State health officers.

Section VI recommends such "supplemental activities" as those of the Division of Social Protection, Office of Defense Health and Welfare Services, and expansion of such activities by the appropriate Federal, State, and local official and voluntary agencies.

THE USE OF MUCIN IN EXPERIMENTAL INFECTIONS OF MICE WITH *VIBRIO CHOLERAE*[1]

By JAMES J. GRIFFITTS, *Assistant Surgeon, United States Public Health Service*

Koesoemadilaga (*1*) has reported the use of mice in the study of experimental cholera infections. Following the injection of several hundred million vibrios, intraperitoneally, organisms may be found throughout the tissues of the animal.

The enhancement, by mucin, of the mouse-killing capacity of human pathogenic organisms is well known. Pacheco and Noronha Peres (*2*) reported that mucin opposed the bactericidal action of cholera antiserum on the vibrio *in vitro*. It is the purpose of this report to describe the influence of mucin on the action of the cholera vibrio in mice.

METHODS

Description of organisms.—Strains No. 35 (Inaba) and No. 41 (Ogawa) were forwarded from India in April 1941. These strains had been isolated from recent cases of cholera. The effect of a 3½-month interval en route, without transfer, on the virulence and other prop-

[1] From the Division of Biologics Control, National Institute of Health.

erties of these strains cannot be determined. On arrival, the cultures were dried in vacuo from the frozen state at minus 72° C., and no changes in their properties have been noted since drying.

Strain No. 6 was originally obtained from Manila, P. I. The date of isolation is unknown. It was forwarded to the National Institute of Health in 1941 by Dr. C. E. Dolman of Vancouver.

Strain No. 34–1 was isolated from a case during an epidemic at Hong Kong in 1939. It was sent to the National Institute of Health by Doctor Dolman in 1941.

Strain No. 82 has been at the Institute since 1921. It has been transferred to fresh nutrient agar at 6-week intervals. The history of isolation is not available.

Strain No. 530 has been at the National Institute of Health since 1927. The history of isolation is not available.

All strains examined produced acid from mannose and saccharose, while none fermented arabinose (Type I Heiberg). The strains were agglutinable with "O" antisera, prepared from boiled suspensions of strain No. 35. No hemolysis of goat red cells was produced by any of the above strains (*3*).

Test animal.—Female, white Swiss mice, weighing 12–14 gm., of a closely inbred strain, have been used throughout. It has been noted that larger mice are not as uniformly susceptible to smaller doses of organisms.

The organism.—A dried culture is suspended in beef infusion broth and, after 2 to 3 hours' incubation at 37° C., beef infusion agar slants are inoculated and incubated overnight. A second transfer is made to agar slants. The growth resulting from 5 hours' incubation is washed from the slant with physiological saline and diluted with saline so that the suspension of vibrios is equal in turbidity to 500 p. p. m. of silica standard (*4*). This represents the undiluted test dose, and contains 2 to 3 billion vibrios per cc. by chamber count. Pour plate colony counts made from the 10^{-7} dilution of this suspension average 110 organisms per cc.

Mucin.—Granular mucin is suspended in distilled water to make a 5-percent suspension. The pH of the mixture is adjusted to 7.2–7.4. The suspension is strained through four thicknesses of gauze, distributed into small flasks, and autoclaved at 15 pounds pressure for one-half hour. Mucin suspensions kept at 5° C. may be used for several weeks.

Procedure.—A series of tenfold dilutions, in normal saline, is made from the original suspension. The final dilutions for the test doses are made with 5 percent mucin.

All animals are inoculated intraperitoneally with 0.5 cc. of the indicated dilution. The procedure is complete within 1 hour of the preparation of the inocula. The mice are observed for 72 hours.

RESULTS

The injection of several hundred million living vibrios in saline is followed in 2 to 3 hours by signs of illness, i. e., ruffling of the fur, quiescence, and huddling. At this time vibrios may be cultured from the heart's blood. Deaths occur usually within 18 hours. Postmortem examination reveals injection of the peritoneal surfaces with purulent, blood-tinged fluid. Smears of the peritoneal fluid reveal many vibrios, intracellularly and extracellularly. The organisms may be recovered by culture from the spleen, liver, lungs, and brain of the mouse.

Four to six hours after the introduction of several thousand living vibrios, in mucin, into the peritoneal cavity of a mouse, vibrios may be recovered from the heart's blood. After 12 to 14 hours, when the animal is moribund, larger numbers of organisms may be found by culturing the lungs, spleen, liver, and kidney. Death usually occurs in 16 to 18 hours with the larger infecting doses, while with smaller numbers of vibrios, death occurs in 24 to 48 hours.

The extreme loss of fluids which characterizes cholera infections in man has not been noted in mice. There is increased defecation, but the fecal material is formed. This infection in mice is a fulminating bacteremia, and it is thought that death of the animal is due in part to the toxic action of the vibrios.

The degree of enhancement, by mucin, of the lethal action of *V. cholerae* is shown in table 1. The data given represent experiments made over a 4-month period.

TABLE 1.—*Summary of experiments. The effect of mucin on the lethal action of six strains of V. cholerae. (Mice, females, 14 to 16 gm.)*

Strain No.	Year of isolation	Suspending media							
		Saline		5 percent mucin					
		Approximate number of viable organisms injected intraperitoneally [1]							
		500 million	50 million	500 thousand	50 thousand	5,000	500	50	5
35	1941	[2] 28/28	1/30	76/77	84/105	54/70	36/80	19/40	4/39
41	1941	30/30	2/30	37/40	54/60	38/50	21/30	16/20	15/20
34-1	1939	16/17	0/17	10/17	---	6/17	---	---	---
6	?	14/17	0/17	13/17	---	6/17	---	---	---
530	1927	12/17	0/17	2/17	---	1/17	---	---	---
82	1921	3/17	0/17	1/17	---	0/17	---	---	---

[1] Based on the average of pour plate colony counts from the 10^{-7} dilution of all experiments

[2] Numerators give the number of deaths in 72 hours; denominators, the total number of mice injected.

The lethal dose of strains Nos. 35 and 41 is approximately 500,000,000 organisms in saline. One-tenth of this number in saline is not fatal for mice. The injection of as few as 5,000 organisms, in mucin, kills approximately 80 percent of the mice within 72 hours.

Strain Nos. 6 and 34–1 kill mice when large doses in saline are injected. Mucin enhances the lethal action of these vibrios.

Strain 530 is lethal for mice in the larger doses in saline, but its virulence for mice is not enhanced by mucin. Strain 82 is avirulent for mice, with and without mucin. These are the older strains from the standpoint of isolation.

SUMMARY

Recently isolated strains of *Vibrio cholerae* are capable of proliferating and killing mice when relatively small numbers of organisms suspended in mucin are injected intraperitoneally. This enhancing effect of mucin has not been noted with two remotely isolated strains.

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PREVALENCE OF POLIOMYELITIS IN THE UNITED STATES IN 1941

By C. C. Dauer, M. D., *Epidemiologist, District of Columbia Health Department*

In 1941 the number of cases of poliomyelitis reported for the entire country was only slightly less (9 percent) than the number in 1940. The number of cases in 1940 was 9,826, or a rate of 7.4 per 100,000 population, and in 1941 the provisional total[1] was 8,947, or a rate of 6.8. In 1940 (*1*) the disease occurred in epidemic form in several large areas in the north central and northwestern sections of the country, and in several of these areas small localized outbreaks had occurred late in the fall of 1939. In 1941 poliomyelitis was most prevalent in the East South Central and South Atlantic States. Four States in this region, Alabama, Florida, Georgia, and Tennessee, accounted for approximately one-fourth of all the cases reported in the entire country. In the Middle Atlantic States and in Minnesota the incidence of the disease was slightly higher than for the country as a whole.

As shown in table 1, the highest rates of incidence occurred in the following States: Alabama 30.5, Georgia 23.5, Tennessee 18.4, Florida 14.4, and Maryland 13.1. The District of Columbia and Minnesota each had a rate of 10.1. Alabama reported more than twice as many cases in 1941 (836) as in 1936 (391), the only other year in which the disease occurred in widespread epidemic form in that State, insofar

[1] Numbers of cases and case rates for 1941 throughout this report are provisional.

as records are available. There were 735 cases reported in Georgia in 1941; the greatest number reported in any previous year was 157 in 1936. Tennessee reported 123 cases in 1929, 385 in 1936, and 536 in 1941. Florida never reported as many cases in any one year as in 1941 when 273 were recorded; the greatest incidence previously reported was 59 cases in 1925, 42 in 1936, and 66 in 1939. In these four States the incidence of poliomyelitis was greater in 1941 than in any previous year for which records are available.

TABLE 1.—*Poliomyelitis case rates per 100,000 population by States, 1936–41*

	1936	1937	1938	1939	1940	1941
United States	3.5	7.3	1.3	5.6	7.4	6.8
New England						
Maine	5.0	16.1	1.7	5	1.3	4.8
New Hampshire	8	4.9	2	8	4	6.3
Vermont	2.1	7.6	2.3	8.4	1.7	3.9
Massachusetts	1.3	7.9	4	1.7	1.0	4.2
Rhode Island	7	3.2	9	4	1.2	5.2
Connecticut	.9	6.2	1.2	1.6	1.1	6.7
Middle Atlantic						
New York	1.5	4.9	1.1	8.0	1.6	8.2
New Jersey	6	3.6	9	5.3	1.5	8.4
Pennsylvania	1.3	3.3	8	4.2	1.7	7.4
East North Central						
Ohio	5.1	7.9	8	2.3	9.5	7.0
Indiana	1.5	4.2	4	1.6	19.9	3.4
Illinois	8.8	9.9	1.4	2.4	7.6	4.8
Michigan	3.2	9.0	1.2	19.1	23.0	5.1
Wisconsin	1.5	11.4	1.7	3.8	15.7	3.1
West North Central						
Minnesota	1.2	12.6	1.6	20.5	8.4	10.1
Iowa	3.0	9.4	1.5	7.7	36.9	1.7
Missouri	2.7	9.9	6	7	8.3	1.1
North Dakota	2.7	9	1.1	1.9	3.9	2.6
South Dakota	1.9	5.7	4.0	3.6	12.7	4.3
Nebraska	1.7	16.0	7	3.6	14.0	1.0
Kansas	5.0	12.9	6	2.3	30.1	2.7
South Atlantic						
Delaware	4	3.1	8	3.1	8	1.0
Maryland	2.2	4.8	1.0	1.6	9	13.1
District of Columbia	1.1	4.8	4.8	8.0	1.2	10.1
Virginia	2.2	2.4	2.0	1.8	9.3	5.9
West Virginia	3.4	3.7	8	3.5	34.8	2.5
North Carolina	1.5	3.1	1.4	3.3	2.1	4.7
South Carolina	1.2	1.2	1.4	23.8	1.0	8.7
Georgia	4.8	2.7	1.9	3.1	9	28.5
Florida	2.5	1.8	1.8	4.0	1.7	14.4
East South Central						
Kentucky	3.1	4.4	1.3	5.9	7.8	7.7
Tennessee	13.2	4.4	1.1	1.1	1.9	18.4
Alabama	14.6	2.9	3.4	1.5	1.9	30.5
Mississippi	9.5	21.0	3.4	1.8	2.0	6.9
West South Central.						
Arkansas	2.7	16.2	1.6	2.4	1.5	3.0
Louisiana	1.6	6.2	2.0	9	5.5	2.9
Oklahoma	5.0	18.1	1.1	2.2	4.9	2.1
Texas	1.1	10.7	1.0	3.8	2.7	2.0
Mountain						
Montana	2.6	5.8	2.6	1.1	19.1	5.3
Idaho	4.3	3.9	2.4	7.2	13.0	1.9
Wyoming	3.0	16.7	.4	3.5	16.3	4.7
Colorado	6.3	19.4	1.3	13.0	3.5	2.5
New Mexico	7.4	6.1	2.6	26.1	4.3	1.9
Arizona	3.4	6.8	2.2	22.4	1.4	3.0
Utah	1.3	6.4	.8	19.0	11.3	7.4
Nevada	2.0	5.0	.0	2.0	1.0	.0
Pacific						
Washington	4.7	5.3	1.1	1.7	24.6	4.1
Oregon	3.6	6.0	1.5	5.2	5.8	7.5
California	6.4	11.5	2.2	16.6	6.7	3.5

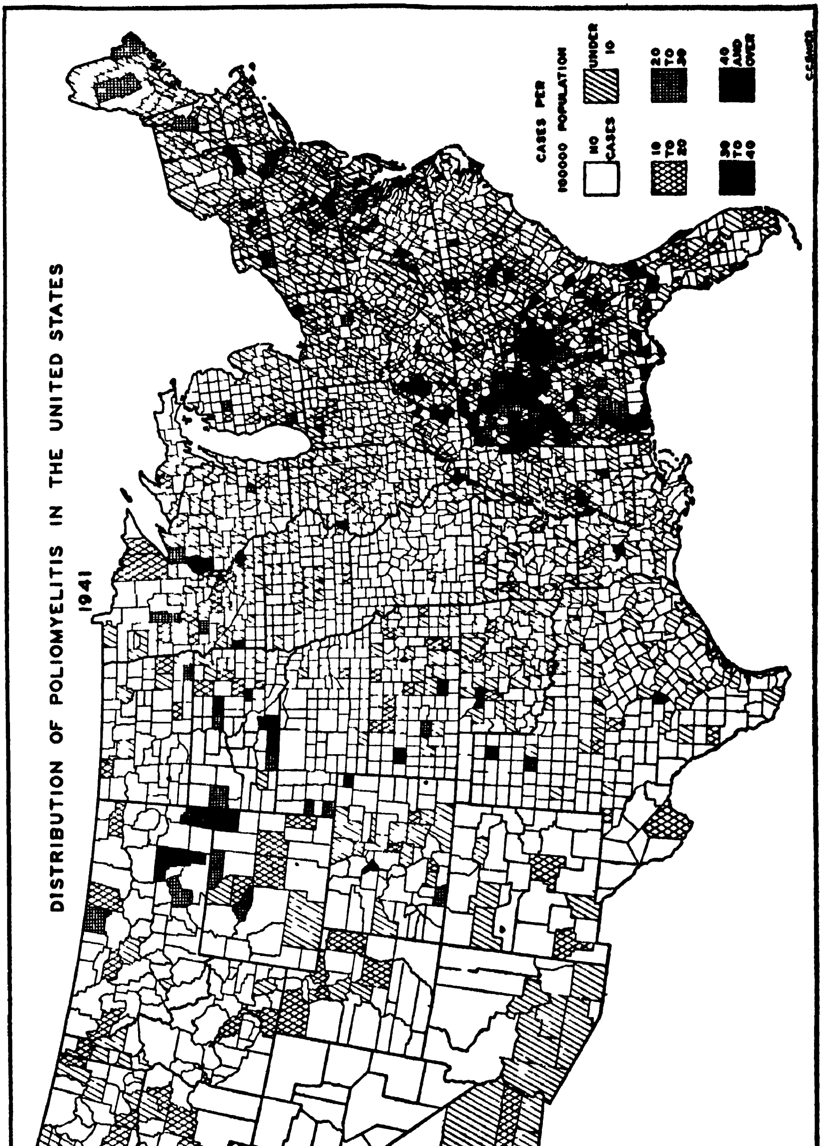
DISTRIBUTION OF POLIOMYELITIS IN THE UNITED STATES
1941
CASES PER
100000 POPULATION
NO CASES
UNDER 10
10 TO 20
20 TO 30
30 TO 40
40 AND OVER

FIGURE 1

The incidence of poliomyelitis was comparatively high in Maryland and the District of Columbia but not in excess of that reported in certain other years. Although the incidence in Minnesota was not excessively high in 1941 it is worth noting in relation to the record of previous years. In no less than 9 separate years from 1916 to 1941, inclusive, as shown in table 2, this State has had a case rate of 10 or more. California has reported a comparatively high incidence in 7 different years during this same period and a few States have had fairly high rates of incidence in 6 separate years. In Minnesota the incidence for the State as a whole has decreased and the intervals between outbreaks have apparently diminished. The case fatality rates given in table 2 would suggest that some decline has occurred in fatality rates but this may have been the result of more complete reporting or the inclusion of a larger proportion of nonparalytic cases in recent years.

The distribution of cases of poliomyelitis by counties[2] in the United States in 1941 is shown in the accompanying map. It shows but one fairly extensive area of high incidence which was spread over the northern parts of Alabama and Georgia, across central Tennessee and a few counties in central Kentucky. In 1936 an outbreak of the disease occurred in the same general region at which time the epidemic area extended across the northwestern part of Alabama and the western end of Tennessee and Kentucky. A few of the counties in northern Alabama which had a high incidence in 1941 were also included in the area of high incidence in 1936. The 1936 outbreak did not involve nearly so large an area as that in 1941.

TABLE 2.—*Case rates and case fatality rates in Minnesota*

Year	Case rate per 100,000 population	Case fatality rate (percent)	Year	Case rate per 100,000 population	Case fatality rate (percent)
1916	40 1	11 55	1933	14 4	9 81
1921	29 5	13 45	1937	12 6	14 36
1925	37 5	15 07	1939	20 5	9 40
1930	18 4	8 45	1941	10 1	
1931	31 8	8 03			

Several small groups of counties located in west central Mississippi, northern Florida and southern Alabama, and north central South Carolina also had localized outbreaks of poliomyelitis in 1941. These small groups were not far from the periphery of the larger area of high incidence. Just what relationship, if any, the smaller groups bore to the larger is not evident.

Florida began reporting poliomyelitis cases in small numbers each week from early in January 1941, a large proportion of them being

[2] Morbidity data by counties used in this report were obtained from reports submitted by State departments of health to the United States Public Health Service

from Miami. The number of cases reported for the State as a whole increased slightly in March, and late in June the number increased sharply, the peak of incidence being reached late in July. However, the peak in Miami was reached in May. Only a few cases were reported in Alabama and Georgia before the latter part of June when the number of cases reported increased sharply and simultaneously in the two States. A significant increase in cases was not noted in Tennessee until July.

In Alabama the highest incidence of poliomyelitis in 1941 occurred in Walker County where 124 cases were reported, or a rate of 193 per 100,000 population. Lawrence County also had a high rate of incidence—35 cases, or a rate of 125. Twenty other counties, which had rates ranging between 30 and 100, reported a total of 556 cases. One of the 22 counties with a rate in excess of 30 in 1941 had reported no more than one case in any one year from 1933 to 1940, inclusive; two of the counties had reported none during this 8-year period. Three of the 22 counties had higher rates in 1936 and 2 had approximately the same number in each outbreak.

In 1941 38 counties in Georgia reported more than 30 cases per 100,000 population, and only one of these had a rate in excess of 100. Twelve of the 38 counties had reported no cases during the preceding 8 years, and 11 had reported no more than one case in any one year. Only one county had reported more cases in a single year from 1933 to 1940, inclusive, but in this instance only a few cases were reported in a county with a small population.

In 1941 Tennessee had 18 counties with rates in excess of 30; 3 of these counties exceeded 100—Franklin with 64 cases and a rate of 267, Trousdale with 9 cases and a rate of 147, and Grundy with 12 cases and a rate of 103. Four of the 18 counties had never reported more than one case in any one year and two had reported no cases from 1933 to 1940, inclusive. One county, which was included in the epidemic of 1941, experienced a much higher rate in 1936 when an outbreak occurred in that area.

One of the group of 5 counties in Kentucky with rates in excess of 30 in 1941 reported 28 cases, or a rate of 311. This county had reported a total of only 12 cases from 1921 to 1940, inclusive, and no more than two cases in any one year during the two decades.

The 7 counties located in Alabama, Georgia, Tennessee, and Kentucky, which had 100 or more cases of poliomyelitis per 100,000 population in 1941, reported a total of 284 cases, and a total of only 37 cases during the 8 years immediately preceding, or an average of less than one case per county per year.

Small groups of counties, or isolated counties, also experienced high incidence rates in other sections of the country. The actual number of cases reported in many of the isolated counties with high rates was

small but owing to small populations the rates are relatively high. A number of cities with populations of 100,000 or more reported fairly large numbers of cases. Outbreaks occurred in Miami and Jacksonville, Fla., Birmingham, Ala., Atlanta, Ga., and Chattanooga and Nashville, Tenn., an unusual number of cities in a single epidemic area to have outbreaks in one year. In other sections of the country cases were reported in significant numbers in Washington, D. C., Baltimore, Md., New York City and Albany, N. Y., Cleveland, Ohio, St. Paul, Minn., and Chicago with some of its suburbs.

During 1941 a number of contributions of varying importance to the understanding of the epidemiology of poliomyelitis appeared in the medical literature. Unfortunately none of the observations recorded have served to clear all of the differences regarding the usual or most frequent portal of entry of the virus in man or the mode of spread of the disease. The observations of Bodian and Howe (*2*) and Sabin (*3*) present laboratory evidence which seems to indicate that the olfactory area is infrequently the portal of entry in human beings. It also appears from their observations that the nasopharynx is the portal of entry in some instances and the intestinal tract in others, but the relative frequency of these routes has not been determined. Experimental air-borne infection of rhesus and cynomologus monkeys was reported by Faber (*4*) but the conditions under which these observations were conducted were such that some portal other than the lower respiratory tract could not be excluded. Even if Faber's observations, as well as those quoted above, should be confirmed, it could not be concluded that infection takes place in man in the same manner.

No evidence has yet been found to prove that water is a means of transmitting the virus of poliomyelitis. It is interesting to note an observation made in Walker County, Ala., during the 1941 outbreak (*5*). Three towns, all obtaining their water supplies from the same source, reported wide differences in prevalence of the disease. Two of the towns reported an incidence 7 and 8 times that recorded for the third, which would seem to indicate that drinking water was not a factor of importance in transmission of the infection in these towns during the summer of 1941. The water is taken from a river, coagulated with lime and alum, allowed to settle, and then filtered through a rapid sand filter. It is then chlorinated with liquid chlorine and delivered through a closed distribution system to the three towns.

It was reported by Rosenau and Brues (*6*) in 1912 that the stable fly (*Stomoxys calcitrans*) could transmit poliomyelitis in rhesus monkeys Anderson and Frost (*7*) in the same year confirmed this observation but were never able to repeat their results and no further evidence that flies might act as vectors was produced until the summer of 1941. Several investigators (*8, 9, 10*) recently have reported the recovery of poliomyelitis virus from flies caught in areas where the

disease was prevalent in the summer of 1941. Such samples included a number of species of flies, and the areas from which they were obtained included rural or urban communities in Alabama, Connecticut, Georgia, and Ohio. Whether flies are of any importance in the transmission of the disease is not yet evident from these observations.

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LIVE MOUSE FOUND ON AIRPLANE AT MIAMI QUARANTINE STATION

What is believed to be the first reported instance, at least in this country, of a live mouse being found on an airplane at quarantine has been reported by Surgeon G. L. Dunnahoo, medical officer in charge of the Miami (Fla.) quarantine station. Dr. Dunnahoo states that, on April 16, 1942, a live mouse was recovered from the galley of a plane on inspection after its arrival at Miami from San Juan, P. R. The mouse was identified as *Mus musculus musculus*. A careful search revealed no ectoparasites.

Quarantine officers have frequently considered the possibility that rats may become undesirable and dangerous stowaways on airplanes, and thus add to the potential hazard of introducing plague from infected areas by this rapidly expanding means of transportation. Considering the increase in the size of transport planes, the carrying of foodstuffs that are attractive for rats, and the ingenuity of these animals in boarding vessels, seeking food supplies, establishing nesting places and avoiding man's devices for destroying them, the possibility

of rats boarding airplanes is certainly not remote. And should an infected rat, harboring *Xenopsylla cheopsis* or other species of flea transmitter of plague, succeed in stowing away for the trip, the danger of human infection developing would also not be remote That danger could be completely eliminated only by eliminating the rat and its fleas, including those which may have left the host Before this shall have been accomplished, however, the infection may have been transmitted to some of the passengers or members of the crew

The finding of a mouse aboard a transport plane at its destination indicates the possibility that rats may well emulate their smaller brother, and it definitely emphasizes the necessity for greater vigilance on the part of airplane companies and quarantine officers in combating this danger The value of prevention with reference to plague, as well as to other quarantinable diseases, is predicated upon the fact that, while it may be comparatively easy to keep the disease out of a seaport, it would require much time and effort to eradicate the infection when once it has gained a foothold.

DEATHS DURING WEEK ENDED APRIL 25, 1942

[From the Weekly Mortality Index issued by the Bureau of the Census, Department of Commerce]

	Week ended Apr 25, 1942	Corresponding week, 1941
Data from 88 large cities of the United States		
Total deaths	8 281	8 307
Average for 3 prior years	8 486	
Total deaths, first 16 weeks of year	145 055	148 708
Deaths per 1 000 population first 16 weeks of year annual rate	12 7	13 0
Deaths under 1 year of age	563	539
Average for 3 prior years	518	
Deaths under 1 year of age first 16 weeks of year	9 096	8 558
Data from industrial insurance companies		
Policies in force	64 965 053	64 547 387
Number of death claims	12 361	12 510
Death claims per 1,000 policies in force annual rate	9 9	10 1
Death claims per 1,000 policies first 16 weeks of year, annual rate	10 2	10 7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED MAY 2, 1942

Summary

The incidence of measles continues somewhat high in view of the fact that last year was one of the severest of "measles years" on record for the United States as a whole, if not the severest, so far as indicated by reported cases. The present high incidence of the disease, however, is maintained largely by localized epidemics in California, where more than one-fourth of the current cases were reported. Of a total of 25,479 during the current week, California reported 6,524, as compared with 355 cases for the corresponding week last year and 259 in 1940 The incidence is also higher than last year in the New England, West Central, and Mountain areas.

A total of 80 cases of meningococcus meningitis was reported, 18 of which occurred in New York, 14 in New York City, where the incidence has been unusually high during the current season, especially in March and April. For the country as a whole, the number of cases reported currently is above that for the corresponding week of any other year since 1937. The peak was probably reached during the week ended April 11, when 112 cases were reported.

Smallpox incidence continues at a record low, with 15 scattering cases reported, as compared with 71 cases for the same week last year (a previous low for the week), and with a 5-year (1937–41) median of 363 cases. Diphtheria, poliomyelitis, scarlet fever, typhoid fever, and whooping cough are also below the 5-year median expectancy.

Other current reports include 1 case of anthrax (in Pennsylvania), 14 cases of amebic dysentery, 86 of bacillary dysentery (49 in Texas), 37 of unspecified dysentery (18 in Arizona, 15 in Virginia), 12 cases of Rocky Mountain spotted fever (11 in the Northwestern States, 1 in Indiana), 10 cases of tularemia, and 20 cases of endemic typhus fever.

The death rate for 88 large cities of the United States, which increased slightly during the current week, is 12.0 per 1,000 population, as compared with 11.6 for both the preceding week and the 3-year (1939 41) average for the corresponding week. This is the fourth week of the current year with a rate above the 3-year average.

Telegraphic morbidity reports from State health officers for the week ended May 2, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria: Week ended— May 2, 1942	Diphtheria: Week ended— May 3, 1941	Diphtheria: Median 1937-41	Influenza: Week ended— May 2, 1942	Influenza: Week ended— May 3, 1941	Influenza: Median 1397-41	Measles: Week ended— May 2, 1942	Measles: Week ended— May 3, 1941	Measles: Median 1937-41	Meningitis, meningococcus: Week ended— May 2, 1942	Meningitis, meningococcus: Week ended— May 3, 1941	Meningitis, meningococcus: Median 1937-41
NEW ENG.												
Maine	1	0	1	1	3	3	148	190	166	3	0	0
New Hampshire	0	0	0	------	------	------	22	89	31	2	1	0
Vermont	0	1	1	------	------	------	134	72	72	0	0	0
Massachusetts	3	1	4	------	------	------	1,559	975	667	5	1	2
Rhode Island	1	2	0	------	2	------	323	3	26	1	0	0
Connecticut	0	1	2	------	1	3	447	302	302	2	0	0
MID ATL.												
New York	20	19	19	[1] 7	[1] 5	[1] 15	611	5,619	1,705	18	7	7
New Jersey	5	2	12	5	6	6	817	2,698	1,211	1	1	1
Pennsylvania	7	19	32	------	------	------	1,297	5,624	1,113	6	1	5
E. NO. CEN.												
Ohio	4	16	16	7	9	9	380	4,638	1,086	1	3	3
Indiana	3	6	9	11	13	14	148	1,066	332	0	0	0
Illinois	23	22	27	4	11	18	620	2,148	282	1	1	1
Michigan [2]	1	3	8	------	2	3	438	3,503	629	0	1	1
Wisconsin	0	0	0	52	37	38	1,183	1,873	765	1	0	1
W. NO. CEN.												
Minnesota	1	3	3	1	2	2	1,015	25	116	0	0	0
Iowa	7	2	3	1	3	3	273	218	191	0	0	0
Missouri	1	3	7	3	------	5	473	633	40	2	0	2
North Dakota	3	1	1	7	6	6	42	31	31	0	0	0
South Dakota	0	0	1	------	------	------	20	14	5	0	1	1
Nebraska	7	0	0	13	------	------	363	12	35	0	0	0
Kansas	3	4	4	1	8	8	616	990	605	0	1	0
SO. ATL.												
Delaware	0	0	0	------	------	------	13	158	25	1	0	0
Maryland [2]	4	2	4	3	3	4	489	403	348	7	3	1
Dist. of Col.	0	0	4	------	------	------	84	299	75	4	0	0
Virginia	5	5	5	162	109	109	180	1,518	634	1	3	3
West Virginia	2	5	7	14	14	41	78	777	123	2	1	2
North Carolina	5	13	10	38	3	14	686	1,792	716	1	2	2
South Carolina	3	5	5	291	270	270	150	987	120	1	1	1
Georgia	10	5	5	29	58	53	211	717	148	0	0	1
Florida	2	0	4	1	61	1	363	468	220	0	0	0
E. SO. CEN.												
Kentucky	6	2	6	1	4	12	142	1,025	405	2	3	3
Tennessee	2	1	3	51	27	30	168	565	190	4	1	1
Alabama	2	5	8	65	22	45	263	626	178	4	0	1
Mississippi [2]	3	5	5	------	------	------	------	------	------	0	1	0
W. SO. CEN.												
Arkansas [3]	4	0	3	44	75	63	133	370	132	1	0	1
Louisiana	5	2	8	3	3	14	320	47	17	1	0	0
Oklahoma	2	7	2	46	61	61	242	148	127	0	0	0
Texas	24	18	31	544	511	479	1,720	1,456	930	4	0	2
MOUNTAIN												
Montana	2	2	2	1	------	10	158	51	51	0	0	0
Idaho	0	0	0	------	------	2	28	10	22	0	0	0
Wyoming	0	0	0	116	------	------	86	34	42	0	0	0
Colorado	8	11	9	22	18	10	308	636	356	0	0	0
New Mexico	5	0	1	------	1	------	72	246	74	0	0	0
Arizona	0	1	1	89	124	69	178	98	98	0	0	0
Utah [2]	0	4	0	5	13	------	1,446	29	93	0	0	0
Nevada	0	0	------	------	------	------	------	2	------	0	0	------
PACIFIC												
Washington	1	2	1	2	14	------	318	44	53	2	0	0
Oregon	0	3	2	17	20	27	190	226	75	0	1	1
California	6	8	12	84	312	81	6,524	355	355	2	0	1
Total	191	211	355	1,741	1,831	1,698	25,479	43,819	15,087	80	34	47
17 weeks [3]	4,878	4,736	7,885	71,036	474,282	151,146	305,155	577,618	226,969	1,311	856	856

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended May 2, 1942, and comparison with corresponding week of 1941 and 5-year median—Continued

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	May 2, 1942	May 3, 1941		May 2, 1942	May 3, 1941		May 2, 1942	May 3, 1941		May 2, 1942	May 3, 1941	
NEW ENG.												
Maine	1	0	0	18	4	12	0	0	0	0	0	0
New Hampshire	0	0	0	17	1	4	0	0	0	0	0	0
Vermont	0	0	0	2	12	7	0	0	0	2	0	0
Massachusetts	0	0	0	326	196	196	0	0	0	0	5	3
Rhode Island	0	0	0	19	5	15	0	0	0	0	0	0
Connecticut	0	0	0	36	76	93	0	0	0	0	2	1
MID. ATL.												
New York	0	0	0	478	507	675	0	0	0	8	6	6
New Jersey	0	0	0	153	294	246	0	0	0	0	3	3
Pennsylvania	0	0	0	513	377	377	0	0	0	3	7	7
E. NO. CEN.												
Ohio	0	2	1	283	296	340	0	1	1	5	3	6
Indiana	0	1	0	90	103	114	1	6	10	0	0	2
Illinois	0	0	1	191	287	487	1	2	19	2	4	4
Michigan [3]	0	0	0	148	285	412	0	6	6	2	3	3
Wisconsin	0	0	0	171	92	184	1	3	3	0	1	1
W. NO. CEN.												
Minnesota	1	0	0	72	44	88	0	2	2	1	0	0
Iowa	0	0	0	40	40	116	1	2	36	2	1	2
Missouri	0	0	0	87	141	141	1	17	18	1	0	2
North Dakota	0	0	0	9	3	12	0	1	7	0	2	0
South Dakota	0	0	0	18	19	15	0	1	2	0	0	0
Nebraska	0	0	0	19	29	29	0	0	8	0	0	0
Kansas	0	0	0	75	46	68	0	0	1	1	1	1
SO. ATL.												
Delaware	0	0	0	32	17	9	0	0	0	0	0	0
Maryland [3]	0	0	0	96	40	40	0	0	0	3	0	1
Dist. of Col.	0	0	0	13	13	18	0	0	0	1	2	0
Virginia	1	0	0	17	12	17	0	0	0	3	0	2
West Virginia	0	0	0	24	46	41	0	0	0	4	9	8
North Carolina	0	0	0	19	23	23	1	0	1	2	0	2
South Carolina	0	0	1	1	7	3	0	0	0	1	3	4
Georgia	2	0	0	15	15	10	1	1	0	8	7	2
Florida	0	1	0	5	1	5	0	0	0	6	2	2
E. SO. CEN.												
Kentucky	1	3	0	54	108	42	0	0	0	9	10	5
Tennessee	1	1	0	44	66	53	2	0	0	3	4	2
Alabama	2	0	0	13	12	8	1	0	3	0	1	1
Mississippi [4]	2	0	0	0	1	4	0	4	1	1	1	2
W. SO. CEN.												
Arkansas [3]	0	1	0	1	5	6	2	0	4	1	2	4
Louisiana	0	0	1	4	4	9	1	0	0	7	2	6
Oklahoma	0	0	0	5	24	24	2	0	12	0	0	4
Texas	3	1	1	27	57	57	0	5	13	6	6	8
MOUNTAIN												
Montana	0	0	0	18	24	24	0	0	3	0	2	1
Idaho	0	0	0	0	5	5	0	0	5	0	1	1
Wyoming	0	0	0	5	3	5	0	0	0	1	0	0
Colorado	0	0	0	12	29	34	0	0	2	0	1	0
New Mexico	0	0	0	6	6	11	0	0	0	0	0	1
Arizona	0	0	0	2	4	8	0	5	4	0	0	1
Utah [3]	0	0	0	11	13	13	0	0	0	0	2	0
Nevada	0	0	-----	-----	0	-----	0	0	-----	0	0	-----
PACIFIC												
Washington	0	0	0	32	15	35	0	0	1	0	0	1
Oregon	0	0	0	6	16	26	0	15	15	1	1	1
California	1	3	2	107	126	169	0	0	17	3	5	5
Total	15	13	16	3,334	3,549	4,577	15	71	363	87	100	115
17 weeks [3]	358	377	355	66,364	64,109	86,301	377	796	5,485	1,303	1,308	1,880

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended May 2, 1942—Continued

Division and State	Whooping cough: Week ended—May 2, 1942	Whooping cough: Week ended—May 3, 1941	Week ended May 2, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	17	8	0	0	0	0	0	0	0	0	0
New Hampshire	0	28	0	0	0	0	0	0	0	0	0
Vermont	37	11	0	0	0	0	0	0	0	0	0
Massachusetts	240	225	0	0	7	0	0	0	0	0	0
Rhode Island	39	21	0	0	0	0	0	0	0	0	0
Connecticut	83	73	0	0	0	0	0	0	0	0	0
MID. ATL.											
New York	499	285	0	2	13	0	1	0	0	0	2
New Jersey	350	116	0	0	0	0	0	0	0	0	0
Pennsylvania	246	334	1	1	4	0	0	0	0	0	0
E. NO. CEN.											
Ohio	171	404	0	0	0	0	0	0	0	0	0
Indiana	83	47	0	0	0	0	0	0	1	0	0
Illinois	217	91	0	2	6	0	1	0	0	0	0
Michigan [2]	150	440	0	0	1	0	0	0	0	0	0
Wisconsin	197	94	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	40	103	0	0	0	0	0	0	0	1	0
Iowa	16	55	0	0	1	0	0	0	0	0	0
Missouri	16	56	0	0	0	2	0	0	0	0	0
North Dakota	3	36	0	0	0	0	1	0	0	0	0
South Dakota	0	23	0	0	0	0	0	0	0	0	0
Nebraska	3	17	0	0	0	0	0	0	0	0	0
Kansas	41	116	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	1	5	0	0	0	0	0	0	0	0	0
Maryland [2]	45	88	0	0	0	2	0	0	0	1	0
Dist. of Col.	27	14	0	0	0	0	0	0	0	0	0
Virginia	52	96	0	0	0	15	0	0	0	0	0
West Virginia	14	48	0	0	0	0	0	0	0	0	0
North Carolina	105	201	0	0	0	0	0	0	0	0	0
South Carolina	81	165	0	0	0	0	0	0	0	0	0
Georgia	32	20	0	1	3	0	0	0	0	1	10
Florida	30	26	0	1	0	0	0	0	0	0	2
E. SO. CEN.											
Kentucky	91	99	0	0	0	0	0	0	0	0	0
Tennessee	42	42	0	0	0	0	2	0	0	0	1
Alabama	16	47	0	0	0	0	0	0	0	0	2
Mississippi [2]	0	-	0	0	0	0	0	0	0	0	0
W. SO. CEN.											
Arkansas [3]	13	27	0	0	1	0	0	0	0	3	0
Louisiana	12	3	0	0	0	0	0	0	0	0	0
Oklahoma	58	33	0	0	0	0	0	0	0	0	0
Texas	213	420	0	7	49	0	0	0	0	5	3
MOUNTAIN											
Montana	14	19	0	0	0	0	1	0	3	0	0
Idaho	0	3	0	0	0	0	0	0	1	0	0
Wyoming	19	1	0	0	0	0	0	0	3	0	0
Colorado	22	217	0	0	0	0	0	0	1	0	0
New Mexico	33	7	0	0	0	0	0	0	0	0	0
Arizona	24	43	0	0	0	18	1	0	0	0	0
Utah [2]	22	98	0	0	0	0	0	0	0	1	0
Nevada	0	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	56	153	0	0	0	0	0	0	2	0	0
Oregon	44	27	0	0	0	0	0	0	1	0	0
California	375	658	0	0	1	0	1	1	0	0	0
Total	3,889	5,272	1	14	86	37	8	1	12	10	20
17 weeks	65,384	76,911									

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Corrected report from Arkansas, Mar. 1 to Apr. 25: Increases, 53 cases of measles, 1 case of poliomyelitis, 1 of smallpox, and 1 of typhoid fever; deductions, 71 cases of influenza and 1 case of meningitis.

WEEKLY REPORTS FROM CITIES

City reports for week ended April 18, 1942

This table lists the reports from 88 cities of more than 10,000 population distributed throughout the United States and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	1	0	9	0	0	0	3	0	3	0	0	1
Baltimore, Md	2	0	6	2	379	6	22	0	17	0	1	39
Barre, Vt	0	0		0	1	0	0	0	0	0	0	2
Billings, Mont	0	0		0	7	0	0	0	0	0	0	1
Birmingham, Ala	1	0	5	2	3	0	3	0	4	0	0	8
Boston, Mass	0	0		0	261	2	24	0	107	0	0	60
Bridgeport, Conn	0	0		0	13	0	2	0	3	0	0	2
Brunswick, Ga	0	0		0	11	0	0	0	1	0	0	0
Buffalo, N Y	0	0		0	16	0	4	0	13	0	0	3
Camden, N J	0	0		0	0	0	1	0	7	0	0	0
Charleston, S C	0	0	24	0	1	0	4	0	0	0	1	1
Charleston, W Va	1	0	1	0	0	0	0	0	1	0	0	1
Chicago, Ill	9	1		1	128	0	37	0	94	0	0	89
Cincinnati, Ohio	3	0	1	0	0	0	4	0	23	0	0	15
Cleveland, Ohio	2	0	3	1	12	0	6	0	71	0	0	17
Columbus, Ohio	0	0	1	1	24	0	6	0	10	0	0	6
Concord, N H	0	0		0	0	0	2	0	1	0	0	0
Cumberland, Md	0	0		0	0	0	1	0	0	0	0	0
Dallas, Texas	2	0	2	2	178	0	2	0	3	0	0	3
Denver, Colo	3	0	8	0	135	0	5	0	4	0	0	19
Detroit, Mich	1	1		0	35	4	14	0	110	0	0	61
Duluth, Minn	0	0		0	2	0	1	0	9	0	0	0
Fall River, Mass	1	0		1	72	0	1	0	56	0	0	0
Fargo, N Dak	0	0		0	1	0	0	0	0	0	0	0
Flint, Mich	0	0		0	0	0	1	0	2	0	0	0
Fort Wayne, Ind	0	0		0	0	0	2	0	0	0	0	3
Frederick, Md	0	0		0	0	0	1	0	0	0	0	0
Galveston, Texas	0	0		0	7	0	1	0	0	0	1	0
Grand Rapids, Mich	0	0		0	1	0	0	0	0	0	0	2
Great Falls, Mont	0	0		0	42	0	3	0	0	0	0	9
Hartford, Conn	0	0		0	37	0	1	0	2	0	1	8
Helena, Mont	0	0		0	1	0	0	0	1	0	0	0
Houston, Texas	1	0		0	79	0	8	0	6	0	0	5
Indianapolis, Ind	2	0		0	48	0	10	0	27	0	0	15
Kansas City, Mo	0	0		0	134	0	3	0	45	0	0	0
Kenosha, Wis	0	0		0	18	0	1	0	2	0	0	19
Little Rock, Ark	0	0	8	0	27	0	0	0	0	0	0	2
Los Angeles, Calif	4	1	16	1	828	1	13	1	14	0	0	28
Lynchburg, Va	0	0		0	1	0	2	0	0	0	0	12
Memphis, Tenn	0	0	13	2	18	0	9	0	7	2	0	12
Milwaukee, Wis	0	1		0	152	0	0	0	33	0	0	34
Minneapolis, Minn	1	0		0	376	0	7	0	13	0	0	8
Missoula, Mont	0	0	2	0	0	0	1	0	1	0	0	0
Mobile, Ala	0	0	1	3	0	0	3	0	0	0	1	0
Nashville, Tenn	0	0		0	1	0	3	0	1	0	0	2
Newark, N J	0	0	1	0	288	4	7	0	10	0	0	21
New Haven, Conn	0	0		0	276	0	0	0	0	0	0	6
New Orleans, La	4	0	3	3	79	0	5	16	4	0	2	2
New York, N. Y	18	0	14	1	116	14	75	2	284	0	4	225
Omaha, Nebr	1	0		0	180	0	2	0	2	0	0	0
Philadelphia, Pa	1	0	2	0	57	2	31	0	262	0	1	106
Pittsburgh, Pa	0	0		0	10	1	12	0	23	0	0	23
Portland, Maine	0	0		1	12	2	4	0	2	0	0	8
Providence, R. I	0	0		0	177	0	6	1	8	0	0	22
Pueblo, Colo	0	0		0	6	0	1	0	1	0	0	0
Racine, Wis	0	0		0	236	0	0	0	2	0	0	22
Reading, Pa	0	0		1	5	0	3	0	1	0	0	5
Richmond, Va	0	0		0	2	0	3	0	5	0	0	3

City reports for week ended April 18, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Roanoke, Va	0	0	----	0	0	0	0	0	0	0	0	0
Rochester, N Y	0	0	-----	0	1	1	2	0	4	0	0	3
Sacramento, Calif	0	0	---	0	128	0	2	0	1	0	0	25
St Joseph, Mo	0	0	--	0	3	0	1	0	0	0	0	0
St Louis, Mo	1	0	--	1	201	0	13	0	20	0	1	5
St Paul, Minn	0	0	---	1	287	0	5	0	1	0	0	15
Salt Lake City, Utah	0	0	-	0	70	0	4	0	1	0	0	8
San Antonio, Tex	2	0		3	22	0	2	0	4	0	0	10
San Francisco, Calif	0	0	7	1	314	0	15	0	4	0	0	27
Savannah, Ga	0	0	4	0	5	0	1	0	0	0	0	5
Seattle, Wash	0	0	-----	3	36	1	1	0	3	0	0	28
Shreveport, La	0	0	----	1	2	0	0	0	0	0	0	0
South Bend, Ind	0	0	-	0	3	0	1	0	10	0	0	0
Spokane, Wash	0	0	1	1	24	0	7	0	1	0	0	7
Springfield, Ill	0	0	--	0	247	0	2	0	5	0	1	1
Springfield, Mass	0	0	-----	0	28	0	8	0	13	0	1	4
Superior, Wis	0	0	-	0	0	0	2	0	1	0	0	0
Syracuse, N Y	0	0		0	87	0	0	0	2	0	0	30
Tacoma, Wash	1	0	---	0	6	0	1	0	6	0	0	1
Tampa, Fla	0	0	---	0	58	0	2	0	0	0	1	1
Terre Haute, Ind	0	0	--	0	0	0	1	0	0	0	0	0
Topeka, Kans	0	0		0	18	0	0	0	2	0	0	1
Trenton, N J	0	0		0	1	0	1	0	9	0	0	5
Washington, D C	0	0	2	1	82	2	15	0	15	0	0	19
Wheeling, W Va	0	0	--	0	6	0	2	0	0	0	0	1
Wichita, Kans	0	0	---	0	94	0	3	0	4	0	0	3
Wilmington, Del	0	0	-	0	3	1	1	0	9	0	0	0
Wilmington, N C	0	0	---	0	4	0	1	0	0	0	1	0
Winston-Salem, N C	0	0	-----	0	74	0	1	0	0	0	0	0
Worcester, Mass	0	0	--	0	3	0	16	0	10	0	0	46

Dysentery, amebic—Cases Fargo, 2, St Louis, 1, San Antonio, 1
Dysentery, bacillary—Cases New York, 1
Encephalitis, infectious—Cases Chicago, 1, Detroit, 1, Los Angeles, 1, Milwaukee, 1
Typhus fever.—Cases Charleston, S C, 4

Rates (annual basis) per 100,000 population for the group of 88 cities in the preceding table (estimated population, 1942, 34,015,616)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Apr. 18, 1942	9 50	20 54	5 21	965 73	72 05	215 99	0 31	2 61	179 35
Average for week, 1937–41	14 54	36 05	8 66	[1]722 00	90 66	288 54	2 78	2 94	187 51

[1] Median.

FOREIGN REPORTS

AUSTRALIA

Infectious diseases—52 weeks ended December 27, 1941.—During the 52 weeks ended December 27, 1941, cases of infectious diseases were reported in the Commonwealth of Australia as follows. The figures are provisional

Disease	Cases	Disease	Cases
Anthrax	2	Lethargic encephalitis	27
Cerebrospinal fever	1 470	Malaria	44
Chickenpox	11	Measles	424
Coastal fever	22	Poliomyelitis	254
Dengue	1 446	Puerperal fever	526
Diphtheria	9 199	Scarlet fever	[illegible] 015
Dysentery	67	Tetanus	11
Erysipelas	97	Tuberculosis	3 982
Filariasis	2	Typhoid fever	169
German measles	23	Typhus fever (endemic)	76
Hookworm disease	13	Undulant fever	5
Influenza	76	Weil's disease	28
Leprosy	55	Whooping cough	1 073

Estimated population approximately 7 500 000

CANADA

Provinces—Communicable diseases—Week ended April 4, 1942.—During the week ended April 4, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		1		3	6		1	1		12
Chickenpox		15		105	194	28	24	24	119	509
Diphtheria	2	16		20	3	2	1		2	46
Dysentery				1						1
German measles		1		17	40		14	8	44	124
Influenza		7			2	7	55		29	100
Measles			1	388	155	155	145	12	14	870
Mumps	1	3		275	333	117	312	44	343	1 428
Pneumonia	6				29		2		18	55
Poliomyelitis			2	2						4
Scarlet fever	2	24	7	109	298	51	82	44	35	652
Smallpox							1			1
Trachoma									4	4
Tuberculosis	2	5	17	122	50		2		8	206
Typhoid and paratyphoid fever	-			17	2		2			21
Undulant fever					2				2	4
Whooping cough	4	19		146	102	2	6	6	26	311
Other communicable diseases	9	7	---	7	206	6	12		7	254

COSTA RICA

Communicable diseases—March 1942.—During the month of March 1942, certain communicable diseases were reported in Costa Rica as follows:

Disease	Cases	Deaths
Diphtheria	21	3
Measles	241	3
Typhoid fever	14	1
Whooping cough	63	

FINLAND

Notifiable diseases—January 1942.—During the month of January 1942, cases of certain notifiable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	185	Poliomyelitis	2
Dysentery	4	Scarlet fever	351
Influenza	2,458	Typhoid fever	44
Paratyphoid fever	115		

SWEDEN

Notifiable diseases—November–December 1941.—During the months of November and December 1941, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	November	December	Disease	November	December
Cerebrospinal meningitis	11	10	Poliomyelitis	62	39
Diphtheria	60	70	Scarlet fever	1,555	1,434
Dysentery	71	24	Syphilis	34	28
Epidemic encephalitis		2	Typhoid fever	10	3
Gonorrhea	866	1,002	Undulant fever	1	4
Paratyphoid fever	17	21	Weil's disease		1

SWITZERLAND[1]

Notifiable diseases—September–October 1941.—During the months of September and October 1941, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	September	October	Disease	September	October
Cerebrospinal meningitis	14	16	Mumps	26	64
Chickenpox	60	96	Paratyphoid fever	3	13
Diphtheria	92	106	Poliomyelitis	409	439
Dysentery	1		Scarlet fever	268	292
German measles	8	7	Tuberculosis	227	349
Influenza		1	Typhoid fever	4	5
Lethargic encephalitis	1	1	Undulant fever	7	11
Malaria	1		Whooping cough	71	93
Measles	86	124			

[1] Figures for the months of November and December are published on page 682 of the PUBLIC HEALTH REPORTS, issue of May 1, 1942.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

Plague

Peru.—During the month of February 1942, plague was reported in Peru as follows: Lambayeque Department, 2 cases; Libertad Department, 1 case; Lima Department, 6 cases, 4 deaths; Piura Department, 1 case.

Typhus Fever

Bulgaria.—For the week ended March 21, 1942, 81 cases of typhus fever were reported in Bulgaria. For the week ended March 14, 54 cases were reported, and for the week ended March 7, 62 cases were reported.

France—Marseille.—During the week ended April 18, 1942, 17 cases of typhus fever were reported in Marseille, France.

Irish Free State—County Wicklow—Tinahely—Knockshanrock.—During the week ended April 11, 1942, 1 case of typhus fever was reported in Knockshanrock, Tinahely, County Wicklow, Irish Free State.

Morocco.—During the week ended April 11, 1942, 1,512 cases of typhus fever were reported in Morocco. During the preceding week 1,509 cases were reported.

Rumania.—During the week ended April 11, 1942, 189 cases of typhus fever were reported in Rumania, 74 cases being reported for the preceding week.

Spain.—During the week ended March 28, 1942, 406 cases of typhus fever were reported in Spain (73 in Madrid and 118 in Barcelona).

Tunisia.—During the week ended April 4, 1942, 800 cases of typhus fever were reported in Tunisia (55 in Tunis and 9 in Sfax). During the preceding week 871 cases were reported (84 in Tunis and 6 in Sfax).

COURT DECISION ON PUBLIC HEALTH

Liability of keeper of dog for death of bitten person from rabies.—(Oklahoma Supreme Court; *Tidal Oil Co.* v. *Forcum et al.*, 116 P.2d 572; decided May 13, 1941, rehearing denied July 8, 1941, and application for leave to file second petition for rehearing denied Sept. 9, 1941.) A wife brought an action for damages arising from the wrongful death of her husband, alleged to have been caused by a dog bite terminating in rabies. The defendants were an oil company and one

of its district superintendents. The evidence showed that the superintendent had charge of the company's general operations over a wide area near Kiefer, Okla., that he was provided by the company with a house and an office which were both within a fenced enclosure, and that he kept the dog involved in the case within this enclosure. The husband of the plaintiff was an employee of the company and was bitten while apparently getting the dog from under the house, although there was a conflict in the evidence on this point. He received antirabic treatment but death ensued.

The plaintiff's action was predicated on the theory that one who keeps and harbors a dog which he knows to be vicious is liable for injuries which it may inflict. In the trial court the plaintiff had judgment and the oil company appealed. The Supreme Court of Oklahoma affirmed this judgment. Briefly stated, some of the conclusions reached by the supreme court were: (*a*) The plaintiff presented sufficient evidence to justify the jury in finding that the superintendent kept the dog with knowledge of its viciousness and that the employee's death proximately resulted from the dog's bite; (*b*) the premises on which the deceased was injured were maintained as a part of the operations of the defendant company and the keeping and harboring of the dog by the superintendent constituted a keeping and harboring by the company; and (*c*) the superintendent's knowledge of the vicious nature of the dog was the knowledge of the company.

In the course of the opinion the court stated that, if the keeper of a known vicious dog permits it to live, he is liable for injuries inflicted by it when suddenly becoming rabid, although he had no time to kill or confine it after learning of its condition before the injuries were inflicted, and cited a Missouri case in support thereof.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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* * *

Public Health Reports

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AN EPIDEMIOLOGICAL STUDY OF POLIOMYELITIS IN MISSISSIPPI IN 1941 [1]

By L. L. Lumsden, *Medical Director (Ret.), United States Public Health Service*

This study of poliomyelitis comprised (1) collection and collation of mortality and morbidity statistics from the records of the Mississippi State Board of Health and local health agencies; (2) surveys of local conditions thought possibly to influence the widely varying rates of incidence of the disease in different parts of the State; (3) collection and analysis of clinical and other data on 133 of the 148 cases reported as poliomyelitis and retained as such on the official records for the period January 1 to November 1, 1941; and (4) obtainment by home visits of 99 fairly comprehensive detailed epidemiological case histories.

INCIDENCE

Table 1 shows the number of deaths from poliomyelitis reported and officially recorded in Mississippi by years from 1914 to 1941, inclusive. It appears that the years of comparatively high mortality (each with 20 or more deaths) in this 28-year period were 1914, 1916, 1926, 1927, 1934, 1936, 1937, and 1938. Thus the intervals between the years of high recorded mortality have been very irregular.

Table 1.—*Deaths from poliomyelitis reported by years and race in Mississippi from 1914 to 1941*

Year	Total	White	Colored	Year	Total	White	Colored
1914	23	8	15	1928	18	13	5
1915	3	0	3	1929	15	6	9
1916	31	14	17	1930	13	3	10
1917	9	4	5	1931	12	8	4
1918	9	3	6	1932	17	10	7
1919	19	9	10	1933	8	6	2
1920	10	7	3	1934	20	14	6
1921	11	8	3	1935	9	5	4
1922	15	5	10	1936	22	12	10
1923	14	6	8	1937	59	34	25
1924	14	9	5	1938	22	13	9
1925	19	13	6	1939	16	13	3
1926	25	16	9	1940	14	5	9
1927	20	14	6	1941	19	10	9

[1] The study was begun on August 11, 1941, and was terminated on November 15, 1941. It was sponsored by the National Foundation for Infantile Paralysis, Inc., and was carried out in active cooperation with the Mississippi State Board of Health and the Mississippi county health departments.

Of the last 12 years, those of comparatively high recorded morbidity (each with over 100 cases) have been 1936, 1937, and 1941. The concentration in 1936 was in the northeastern section of Mississippi in juxtaposition to the localized areas of high incidence in Alabama and Tennessee (*1*); in 1937 it was in the southwestern section of the State, included in the large Mississippi Valley region of high incidence that year (*2*), and in 1941 it was in a group of several adjacent counties in the west central section of the State.

DIAGNOSIS

Inasmuch as epidemiological data collected on cases reported as poliomyelitis under erroneous diagnoses are worse than none, in that they are positively misleading, special effort was made throughout the study to determine as thoroughly as practicable the clinical, laboratory, psychological, and other bases for the diagnoses of the cases recorded in 1941. The effort included (1) consultation with attending private physicians and local health officers and review of their records, (2) review of laboratory findings, (3) physical examination of patients and obtainment of detailed clinical histories from their families at home, (4) review of the records of the poliomyelitis clinics maintained with the support of the National Foundation at Jackson, Miss., Memphis, Tenn., and Mobile, Ala., and (5) constant exercise of all of the clinical knowledge and common sense available to those engaged directly in the epidemiological study.

In frequent instances the diagnosis was made and the case reported after only one brief superficial observation of the patient by the family physician. In some cases the diagnosis was changed by the reporting physician after further observation of the patient and consultation with the county health officer. Some cases remained on the official records although the county health officer became thoroughly satisfied from his observations and consultations that the cases were not poliomyelitis.

In Mississippi and in a number of other States a case reported as poliomyelitis by a private physician remains on the official record as a case of poliomyelitis unless the reporting private physician changes the diagnosis and advises the local health department of the change. It would appear altogether advantageous that qualified full-time local health officers have, and exercise for statistical and other official purposes, definite and full authority in the establishment of *official* diagnoses of cases of infectious disease.

A number of cases originally reported and remaining on the official records as poliomyelitis in Mississippi in 1941 were found by observations made after the original reporting to be cases of acute articular rheumatism, infected femoral or inguinal gland, mechanical injury, infected toenail with resulting lameness, or other conditions presenting

syndromes which only vaguely and only at a hurried superficial glance could have suggested a suspicion of poliomyelitis. The thorough diagnostic work at the poliomyelitis clinic in Jackson, to which were sent for treatment many of the cases in Mississippi in the summer and fall of 1941, was of much specific aid to the epidemiological study.

Here and there a practicing physician appeared to become poliomyelitis-minded and to fancy he could make a skilled definite diagnosis of abortive poliomyelitis among persons who had had no traceable association with paralytic cases of the disease. Some of the cases reported as poliomyelitis after such diagnosing were later found to have been cases of upset stomach of only a few hours' duration in babies, slight acute coryza or tonsillitis, transient diarrhea with only two or three liquid passages, or other conditions of frequent occurrence in communities. Of course, some of these cases may have been attended or caused by poliomyelitis infection, but it seems highly probable that most of them were not properly diagnosable as poliomyelitis.

In one county outside the area of established high incidence nine cases were reported and recorded. The recorded incidence in that county with its sparse population was of outbreak proportion. It was found, however, by subsequent studies at the poliomyelitis clinics and elsewhere that six of these cases were due to conditions other than poliomyelitis.

From a leading practicing physician in a community here and there unusual or original views as to the nature of poliomyelitis were obtained. One contended that all bad colds are poliomyelitis. Another contended that all cases of poliomyelitis are caused by malaria parasites. A few depended largely upon a skin reaction to Rosenow serum for a positive diagnosis. However, the large majority of the doctors of Mississippi with whom consultation was held regarding the diagnosis of reported or suspected cases appeared to have views based on what is generally considered the best available recent knowledge as to the nature of the disease.

In a few cases the clinical and laboratory evidence did suggest mixed infection with poliomyelitis virus and malaria parasites or even the possibility of malaria parasites alone causing the damage to the motor areas of the brain or spinal cord.

In some areas, especially those with a winter case or only one case to a county, more time in the epidemiological study was spent in an effort to determine whether the diagnoses were warranted than in the taking of complete epidemiological histories. Most of the winter cases appeared to have been reported under mistaken diagnoses.

Thirty-four of the 133 cases covered in considerable detail by the epidemiological study were eliminated for detailed comprehensive epidemiological consideration because they appeared certainly or

almost certainly to be reported under erroneous diagnoses. Some of the 34, because of subsequent clinical developments and skilled diagnostic observations, were eliminated after the complete epidemiological histories had been taken. In the course of the study, a few unrecorded cases with either paralysis or strongly suggestive systemic symptoms without paralysis were found and added to the epidemiological list. The general evidence, however, was that in Mississippi in 1941 the cases reported as poliomyelitis under erroneous diagnoses exceeded the number of unreported cases which, under skilled diagnostic procedure, could have been diagnosed definitely as poliomyelitis.

AGE, SEX, AND RACE DISTRIBUTION

The age-sex-race distribution of the cases reported and retained on the official records as poliomyelitis in Mississippi for the period January 1 to November 1, 1941, is shown in table 2.

TABLE 2.—*Cases of poliomyelitis, by age, sex, and race, reported and retained on the official record for the period January 1 to November 1, 1941*

Age in years	White				Negro			
	Male	Female	Total	Percentage	Male	Female	Total	Percentage
Under 5	22	19	41	46.2	17	14	31	52 5
5–9	13	11	24	27 0	6	7	13	22.0
10–14	13	5	18	20 2	6	4	10	17.0
15–19	0	1	1	1.1	2	1	3	5 1
20 and over	4	1	5	5.5	1	1	2	3.4
Total	52	37	89	100	32	27	59	100

The reported incidence per 100,000 population was 8.9 for white persons and 5.8 for Negroes. The difference may have been due in part to more nearly complete reporting of the white cases, but the general evidence obtained in the course of the study was that the actual incidence rate of definite paralytic cases was considerably higher among white persons than among Negroes.

The larger proportion of the total of Negro cases than that of the total of white cases among children under 5 years of age is not sufficient to have much, if any, epidemiological significance. Table 1 shows that in some years, especially in 1914, 1922, 1930, and 1940, the reported deaths among Negroes far exceeded those among white persons. In those years either the morbidity rate or the case fatality rate probably was comparatively high among Negroes.

GEOGRAPHICAL DISTRIBUTION

The distribution of the 148 cases reported and retained as poliomyelitis on the official records for the period January 1 to November 1, 1941, in the 82 counties in Mississippi was as follows: In 29 counties, none; in 22 counties, 1 each; in 12 counties, 2 each; in 8 counties, 3

each; in 5 counties, 4 each; in 1 county, 5; in 1 county, 7; in 2 counties, 9 each; in 1 county, 10; and in 1 county (Yazoo) 18. The counties free from reported incidence are mainly in the east central, the southeastern, and the southwestern sections of the State.

The incidence rate per 100,000 population for the State as a whole was 6.3. The aggregate population of the 29 counties without a case is 573,445. One of the counties without a reported case is Harrison, a resort county, with a population of over 50,000 and with constant passage through it daily of traffic from far and wide. Among the counties with only 1 reported case and with a population of over 40,000 were Coahoma (in which is the city of Clarksdale) and Lauderdale (in which is the city of Meridian), both traversed by heavy lines of intrastate and interstate traffic. The incidence showed no consistent tendency toward concentration along main lines of human travel nor along main river courses nor in urban centers. The incidence was comparatively high, however, in an area comprising 5 counties traversed by an interlacing system of railway freight traffic. Over two-thirds of the cases were in open-country homes which frequently were found to be among the most isolated of the State, on large plantations, or in dense forest regions. These open-country homes were generally from 5 to 50 miles apart—the travel by most direct course required to visit the two nearest to each other often being 30 to 60 miles or more.

In the 12 cities with populations of over 10,000, the incidence of reported cases was as follows:

City	Population (1940 U S Census)	Number of cases	Cases eliminated (erroneous diagnoses)	City	Population (1940 U S Census)	Number of cases	Cases eliminated (erroneous diagnoses)
Biloxi	17,475	0	----------	Jackson	62,107	4	2
Clarksdale	12,168	0	----------	Laurel	20,598	1	----------
Columbus	13,645	1	----------	Meridian	35,481	1	----------
Greenville	20,892	1	----------	Natchez	15,296	0	----------
Greenwood	14,767	2	----------	Vicksburg	24,460	2	----------
Gulfport	15,195	0	----------				
Hattiesburg	21,026	3	1	Total	----------	15	3

Thus the reported incidence in the larger urban centers was 5.5 per 100,000 population and the actual incidence of definitely diagnosable cases probably was less. For the rest of the State, the reported incidence was about 7 per 100,000 population.

There was a definite concentration of reported incidence in 1 region embracing 5 adjacent counties in the west-central part of the State—Yazoo with 18 cases, Holmes with 10, Hinds with 9, Madison with 7, and Le Flore with 5. Yazoo County had the largest number of cases and the highest incidence rate for any county in the State. The rate per 100,000 population for Yazoo County was 45; for Holmes County, 23; for Madison County, 18; for Le Flore County, 9, and for Hinds County, 8.

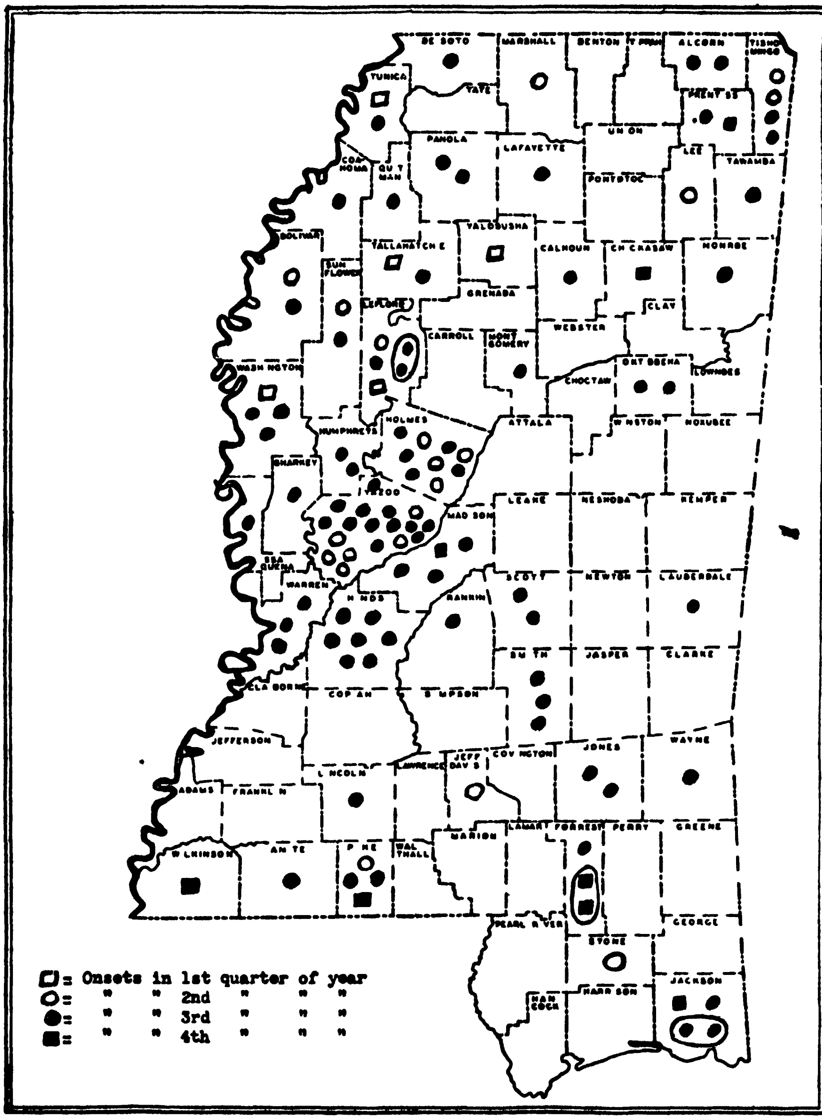

FIGURE 1 —Poliomyelitis recorded in Mississippi from January 1 to November 1, 1941 Cases allocated to place of residence by counties, period of onset of infection indicated, cases of erroneous diagnoses eliminated

Figure 1 shows the distribution of cases by place of residence, and the period during which the infection was considered to have been contracted Not included on this map are the 34 reported cases in which the diagnoses were regarded as certainly or almost certainly erroneous and 1 case, reported in Oktibbeha County, in which the infection very probably was contracted in Alabama. Except for the concentration in the Yazoo County region, the geographical distribu-

tion was widely and thinly scattered. Such geographical distribution appears to have definite epidemiological significance. It is evident that some factor or set of factors operated in the Yazoo County region different in kind or degree from any or all which operated generally in the other large regions of the State. Though analogies are dangerous in epidemiological analyses, the wide, thin distribution of "sporadic" cases of poliomyelitis is somewhat remindful of that of sylvatic plague in the western States or of Rocky Mountain spotted fever in the eastern States.

SEASONAL PREVALENCE

Of the total of 148 cases, 12 had onsets prior to June 1: 1 in January, 4 in February, 2 in March, 1 in April, and 4 in May. From the data obtained, it appears that almost all of the cases with onsets prior to May were reported under erroneous diagnoses.

Of the 99 cases of which detailed histories were obtained, the onsets were: 1 in February, 1 in March, 3 in May, 16 in June, 28 in July, 29 in August, 13 in September, and 8 in October.

In Mississippi in 1941 warm summer-like weather continued through almost all of October; but in some of the counties, each with two or more cases, the onset of the last case found was before the beginning of cool weather. In Yazoo County the onset of the first recorded case was on May 28 and that of the last on August 28. Thus, the period of high incidence, though beginning soon after the advent of warm weather, terminated in most of the affected counties before the warm weather period was over.

EXTENT AND METHOD OF OBTAINING EPIDEMIOLOGICAL HISTORIES OF CASES

Detailed epidemiological histories were taken of 99 of the 148 cases; 34 cases were eliminated because they were determined certainly or almost certainly to have been reported under erroneous diagnoses, and 15 were studied only to the extent of data furnished by report cards. Of the 15 cases not studied comprehensively, 1 occurred in each of the following counties: Calhoun, Chickasaw, Coahoma, De Soto, Itawamba, Marshall, Monroe, Quitman, and Yalobusha; Smith, Tishomingo, and Tunica counties each had 2 cases.

The 99 detailed epidemiological case histories were obtained by consultation with local health officers and/or attending physicians and by visits to the affected homes where painstaking interviews were held with the families and surveys made of the immediate and neighboring premises. Interviews with the families averaged about 50 minutes. Questions were asked with a persistent and consistent effort to obtain facts instead of just answers. The interviews were

exhaustive and often somewhat exhausting. The attitude of the families, without a single exception, was cordial and cooperative.

The form used in obtaining the data was designed to be adequately comprehensive. Its scope is indicated by the numerous items covered under the heading of "Findings" in this report. Some students of the epidemiology of poliomyelitis might regard some of the data collected as unnecessary or irrelevant. However, there are valid reasons for every one of them. For example, to the question of what could shade trees or fruit trees on the premises have to do with the causation of poliomyelitis, the answer would be (1) at a home with shade trees in the yard, the members of the family, children in particular, are likely in warm, fair weather to spend much of their time under the trees, which furnish frequent resting or nesting places for birds and harborage for insects; (2) frequently excreta and often, perhaps, ectoparasites from birds and tree climbing mammals fall into the yard under the trees; (3) fruit trees when blossoming or when bearing fruit attract insects, birds, and other animals; and (4) there remains at least a possibility that some bird or other lower animal serves as a harborage and some insect serves as a vector of some of the varieties of poliomyelitis virus.

Throughout the study in Mississippi in 1941, the fact was kept in mind that we were dealing with a disease, with factors of causation of which there is little or no definitely established knowledge. Therefore, open-mindedness and broad-mindedness and consistent effort to collect every fact which eventually may prove illuminating appeared in order. A valid objection which might be raised against the program is lack of controls. To try to meet this to a limited extent, general surveys were made, usually of neighboring homes and of vicinities intervening between affected homes. In a way all of the unaffected homes in a region serve as a sort of control. It would be difficult to decide how many unaffected homes would have to be studied in detail in order to serve as reasonably satisfactory controls. Encouraging, however, is the fact that without many of the theoretically desirable controls, field epidemiological studies accomplished much in the establishment of definite knowledge of the modes of spread of many infectious diseases, such as typhoid fever, yellow fever, typhus fever, cholera, plague, and so forth.

Another objection which may be raised is that the number of cases covered by the study was too small for the data to have much epidemiological significance. This objection is valid to some extent, but not altogether. Intensive study in a locality with a few cases may be even more clarifying than such study in a comparable locality with many cases where there are likely to be more potentially misleading coincidences with regard to personal contact and other possible factors. It appears reasonable to hope that the program of study

in Mississippi in 1941 will prove eventually of some value in the formulation of a large-scale program of study. Such a study covering hundreds or even thousands of cases in different regions of the country would produce data from which many now apparently possible factors could be eliminated and thus the field for the "rifle work" of our research laboratories might be narrowed advantageously.

FINDINGS

The data presented under this heading apply to the 99 cases of which detailed epidemiological histories were taken and, unless otherwise specified, to the period of 30 days immediately preceding the onset of illness.

Location of affected homes.—Of the 99 cases, 69 were in homes in open country, 6 in homes in villages with populations under 2,500, 13 in homes in towns or cities with populations of 2,500 to 10,000, and 11 in homes in cities with populations of over 10,000.

Twenty-one of the cases were in homes located within a county-seat city, town, or village; 2 in homes within 1 mile, 6 in homes 1–4 miles, 13 in homes 5–9 miles, 18 in homes 10–14 miles, 18 in homes 15–19 miles, and 21 in homes 20 or more miles from the county seat.

Thirty-four of the cases were in homes on a main highway or on a city, town, or village street; 12 in homes within 1 mile, 32 in homes 1–4 miles, 17 in homes 5–9 miles, 3 in homes 10–14 miles, and 1 in a home 15–19 miles from a main highway.

Eleven homes were 1–4 miles from any city, town, or village; 12, 5–9 miles; 3, 10–14 miles; and 1 home over 20 miles.

The homes in cities or towns where cases occurred were generally on the outskirts where conditions with respect to privies, cows, chickens, and so forth, were more rural than urban in character.

Economic status.—Economic status of the families of the patients was good for 7, fair for 29, and poor for 63.

Birthplace of patients and parents.—Seventy-six patients were born in the present home vicinity, 15 elsewhere in Mississippi, and 8 outside Mississippi. Of the fathers, 91 were born in Mississippi and 8 outside the State. Eighty-nine mothers were born in Mississippi and 10 elsewhere. The large majority of cases were in persons who had spent all or nearly all of their lives in Mississippi, mostly in their present home vicinities. The poliomyelitis incidence was largely among persons of local stock.

Visits outside immediate home vicinity.—Only 35 of the cases were in persons who had been outside their immediate home vicinities. A considerable number had remained strictly at home or had been to only 2 or 3 nearby homes. The evidence is that only about 12 probably contracted the infection while away from their immediate home vicinities, in other parts of Mississippi, or in neighboring States.

Places of public assemblage.—The following number of persons had been to places of public assemblage: public bathing beaches or pools, 5; public playgrounds, 9; picnics, 4; camps, 3; county fairs, 2; schools, 6; moving-picture shows, 19; and churches, 41. No two cases gave histories of having been to the same church or other place of public assemblage.

Clinical features.—From all evidence obtained, 69 of the cases appeared to be definite clinical cases of poliomyelitis. In the 30 others the diagnoses seemed very probably correct for 14 and questionable for 16. The presence of paralysis or localized muscular weakness did not always assure the correctness of diagnosis because in some cases the possible or probable effect of syphilis, rickets, mechanical injury, or some other disease or condition came into the picture.

In 60 of the cases there was definite paralysis; in 33, localized muscular weakness; and in 6, neither definite paralysis nor localized muscular weakness.

The anatomical distribution of paralysis or of localized muscular weakness was as follows:

	Cases
Paralysis:	
One or both lower extremities only	33
One or both upper extremities only	7
One or both upper and one or both lower extremities	10
Both legs, lower abdomen, bowel, and bladder	1
Both arms and right side of face	1
Right side of face, right arm, and right leg	1
Left side of face, left arm, and left leg	2
Both arms, bladder, and respiratory	1
Both legs and arms, and throat	1
Throat and respiratory	1
Both legs and respiratory	1
Right forearm	1
Total	60
Localized muscular weakness:	
One or both lower extremities only	25
Upper extremities only	3
Left arm and left leg	2
Left leg, left thumb, and left index finger	1
Both legs and both arms	2
Total	33

Such distribution appears of both pathogenical and epidemiological significance. If the virus travels up nerve tracts to reach the spinal cord or the brain, as is suggested by recent laboratory findings, including especially those of Bodian and Howe (*3*), the marked preponderance of cases with lower extremity involvement over those with upper extremity involvement suggests that the invasion is most commonly through the nerve tracts of the lower extremities or of the

lower part of the trunk instead of through the nerve tracts of the upper respiratory passages, the upper alimentary tract, the upper extremities, or the upper part of the trunk. Of interest in this connection is that in Howe and Bodian's feeding experiments on chimpanzees, with technique designed to prevent invasion through the upper respiratory tract or the pharynx, the motor involvement appearing to result was confined to the upper extremities (*4*). The distribution of motor involvement in cases with natural infection along with the evidence that generally the lower extremities, especially of children, are more exposed than other parts of the body to insect invasion appears to give support to the argument of those who contend that insects should be considered as possible vectors of poliomyelitis infection of persons. Also to be considered is the reported distribution of the paralysis, altogether in the upper extremities, in 11 or 12 children whose cases were attributed (*5*) to an attenuated virus which with prophylactic intent had been injected into or under the skin of the arms. It appears at least conceivable that if the virus can be introduced effectively into the skin with a hypodermic syringe, it may be done also by the proboscis of an insect

An unusual feature observed was the occurrence of fever blisters on the lips concurrently with the attack of poliomyelitis in 17 cases. These cases mostly were in the Delta region where malaria was prevalent.

POSSIBLY PREDISPOSING RECENT ILLNESS OR CONDITIONS

Illness or condition	*Months prior*	*Cases*
Measles	Under 2	4
	3	1
	4	1
	5	1
Mumps	Under 1	2
	2	2
	3	1
	6	1
	8	1
Whooping cough	Under 2	3
	2	4
	3	1
	4	1
	5	1
Colitis or dysentery	1	3
	2	1
Malaria	1	5
	2–12	4
Chickenpox	Under 3	2
Pronounced rickets		2
Pronounced adenoids		2
Chorea		2
Pyelitis		2
Frequent or recent sore throat or tonsillitis		23
Frequent or recent acute coryza		29
Otitis media		4
Foul mouth		9
Habitual constipation		21

Tonsillectomy within 2 months in 1 case; 1–10 years prior in 10 cases.

Unusual physical stress or mechanical injury within 3 weeks prior in 21 cases.

Recent open skin sores (mainly impetigo), infected insect bites, or unhealed wounds on lower extremities, or boils on parts of the body below the waistline in 41 cases.

The number of cases with preceding recent or frequent sore throat, tonsillitis, or acute coryza might suggest to some observers an upper respiratory invasion by the poliomyelitis virus. The frequency of open skin sores on the lower extremities within the 2 or 3 weeks immediately before onset of poliomyelitis along with the anatomical distribution of the paralysis might suggest to others insect conveyance of the poliomyelitis virus.

Among the especially interesting cases was that of a Negro girl, 5 years of age, in Greenwood City. As the eruption from a case of measles was beginning to fade, she developed a high fever followed within a day or two by a left hemiplegia. The face involvement disappeared in about 2 weeks. Three months after the onset, the lower extremity was nearly normal but the muscles of the arm and forearm were limp, functionless, and atrophied.

Artificial immunization.—Of the 99 cases, 22 had had no artificial immunization against any specific disease. The number that had had artificial immunization against one or more of such diseases with the time before the attack of poliomyelitis indicated was as follows:

Immunization against—	Number immunized							
	Prior period (years)							Total cases
	½	1	2	3	4	5	Over 5	
Smallpox	8	6	12	4	4	4	3	41
Diphtheria	6	9	11	10	6	1	9	52
Typhoid fever	4	16	2	7	1		3	33
Whooping cough	1	1	3	1				6
Scarlet fever				1				1
Tetanus			1					1
Rabies			1					1

Poliomyelitis among near relatives.—Among the 99 current cases, 10 were in persons with near relatives who had had poliomyelitis in previous years. The relationship of the previously affected persons to the patients of 1941 was as follows: mother, 2 cases; half-brother, 1 case; uncle, 2 cases; first cousin, 4 cases, and second cousin, 1 case.

Personal characteristics.—Data on personal characteristics were not noted in six of the cases. For the 93 others the following were especially noted:

General health: Good, 63; fair, 18; poor, 12.
Complexion: Fair, 41; medium, 9; dark, 4; Negro, 39.
Spacing of upper incisor teeth: Excessive in 7; normal in 86.
Cutting of teeth: Slow, 5; poor, 2; early, 1; normal, 85.
Rate of physical growth: Slow, 8; rapid, 3; normal, 82.
Body structure: Thin or poor, 19; marked over development, 2; normal, 72.
Physical activity: Over, 22; under, 6; normal, 65.

The general health, physical development, and nutrition found among Negro children on the cotton plantations in the Delta region were remarkably and somewhat surprisingly good.

Among the white children attacked by poliomyelitis, the proportion with fair complexions, many of them very fair, was striking. In rather frequent instances the child with the lightest complexion in a family was the one stricken. Some observers suspect that persons of fair complexion are especially attractive to certain insects.

Household servants.—Only 13 of the cases were in households in which servants were employed. In all instances except one the servant lived at night away from the home of employment. A search was made for definite and also possible clinical cases at the homes and in the immediate home vicinities of the servants. No evidence was obtained suggesting that servants had any important connection in the spread of the infection.

Swimming or wading.—Only 14 of the patients gave histories of having been swimming or wading in creeks, rivers, or lakes, and only 2 of having been in public park pools.

General cleanliness of premises.—Eighteen of the cases were on premises where general cleanliness was good; 43 where it was fair; and 38 where it was poor.

Personal cleanliness.—This was rated as good in the families of 23 of the cases; fair in those of 34, and poor in those of 42.

Body surface exposure to polluted water.—Such exposure appeared probable for 63 of the cases—4 direct, 5 through domestic animals, and 54 through insects.

General character of neighborhood.—Fifteen of the cases were in open-country wooded neighborhoods, 35 on large plantations, 15 in small farm neighborhoods, 6 in suburbs, 14 in thickly built-up urban-like communities and 12 in scattered village-like neighborhoods. The character of the neighborhood was not recorded for 2 cases.

Topography.—Twenty of the 96 affected homes were in hilly vicinities, 35 in rolling, 26 in flat (delta) and 15 in flat (but not delta) vicinities.

Structure and condition of dwelling.—Frame 93, stucco 2, brick 1. Of 90 affected homes where structural condition of dwelling was noted, it was rated as good for 15, fair for 30, and poor for 45.

Age of dwelling.—Under 10 years, 20; 10–19 years, 22; 20 years or more, 54.

Cellar or basement.—Only three of the affected homes had a cellar or basement under the dwelling.

Screening of dwelling.—Complete, 24; partial and inadequate, 34; and none, 38.

Shade trees in yard.—None, 22; present, 74.

Fruit trees, shrubs, or vines on premises.—Peach, 56; pear, 20; apple, 9; plum, 9; fig, 7; grape, 7; mulberry, 2; persimmon, 1; banana, 1; cherry, 1.

Stables or animal pens on immediate or very nearby premises.—For hogs or pigs, 27; for horses or mules, 47; for cows, 36; for chickens, 50.

Domestic animals on or nearby home premises.—Horses on 60, mules on 65, cows on 94, sheep on 7, goats on 5, hogs on 48, dogs on 58, cats on 58, chickens on 87, guineas on 15, ducks on 4, geese on 7, and turkeys on 3. Thus, cows and chickens were most prominently in the picture. There was a history of deaths or of some sort of sickness among some of the animals on 32 of the affected premises within a few weeks before or after the onset of the case of poliomyelitis. At only 2 of the affected homes was a history obtained of "range paralysis" among the chickens.

Wild mammals and birds especially noted on premises or in the immediate vicinity.—Sparrows at 96, rabbits at 60, squirrels at 43, foxes at 23, hawks at 21, crows at 23, skunks at 17, opossums at 18, pigeons at 5, and, in addition to those specified, various birds at 73. English sparrows were most prominently in the picture.

Four of the cases were in children who, from 1 to 2 weeks before onset of illness, had handled sick or dead birds. In three instances the birds were sparrows and in one a field lark. There is some probability that the sickness and death among these birds was due to arsenic used in dusting cotton plants.

Insects.—Especially noted among insects at the 96 affected homes were houseflies and stable or dog flies (*stomoxys calcitrans*) at 96, fleas (in the dwelling) at 51, mosquitoes at 94, wasps at 74, honey bees at 14, ants (in the dwelling) at 60, roaches at 48, gnats (biting, or "eye," or both) at 76, bluebottle or green flies at 41, horseflies (large) at 73, bedbugs at 32, spiders (in the dwelling) at 17, chiggers (red bugs) at 5, and woodticks at 1. Obviously there were plenty of insects for speculative purposes. Among the most conspicuous were *stomoxys calcitrans*, houseflies, and mosquitoes. There was a history of mosquitoes at all of the affected homes except 2. These 2 homes are located in high ridge regions. The diagnoses of the cases at these 2 homes were somewhat doubtful.

Stomoxys calcitrans appeared unusually abundant and voracious in Mississippi in the summer of 1941. In view of the evidence that this insect will fly over 12 miles within a few hours and over 50 miles within 9 days, that it is spread widely by livestock hauled by truck or railway car, that it frequently feeds on man and beast, and that it once had prominence in reported findings from laboratory studies of poliomyelitis, it seems that *Stomoxys calcitrans* properly might again be considered by research laboratory workers for intensive trial to determine

as definitely as possible whether or not it may serve as a vector of some of the varieties of poliomyelitis virus.

Standing or running water apparently suitable for the breeding of mosquitoes and other insects in the home vicinities.—Thirty-nine of the cases were at homes within 100 yards, 13 were at homes 100 to 200 yards, 16 were at homes 200 to 500 yards, 12 were at homes 500 to 1,000 yards, and 19 were at homes over 1,000 yards from such water.

Meals away from home.—Forty-one of the 99 cases were in persons who occasionally or frequently ate meals away from home. No evidence was obtained that any one eating place away from home had served meals to more than one of these persons.

Milk and milk products.—Eighty-five patients gave histories of having used milk habitually as a beverage, nine of having used no fresh milk in any way, and one of having used it only on fruits or cereals. For four the milk history was not obtained.

The milk used was from home or neighbors' cows for all except 16. For these 16 milk was purchased from public dairies. Only 7 used pasteurized milk. Except in the 3 instances of 2 cases to a home, no 2 cases were in persons who used milk from any one source.

Eighteen persons had eaten market-bought butter, 20 had eaten market-bought cheese, and 37 had eaten marketed ice cream. The sources of these purchased milk products were many and there was no evidence that any of them could have been a common denominator for any 3 or more cases.

Eggs.—Histories regarding the eating of eggs were obtained for 94 cases; 51 were in persons who ate only home-produced eggs, 25 in those who ate market-bought eggs, and 18 in those who ate none. There was no evidence that eggs bought at any one market served as a common denominator.

Raw fruits and vegetables.—Among the persons who were afflicted with the disease, 52 ate tomatoes, 41 ate peaches, 16 ate lettuce, 6 ate pears, 11 ate apples, 6 ate oranges, 7 ate bananas, 3 ate grapes, 3 ate cabbage, 4 ate berries, 1 ate carrots, and 3 ate plums. Most of these foods were produced and consumed at individual homes. There was no evidence that any purchased might have been a common denominator to a considerable number of the cases.

Water supplies.—Sixty-five of the cases were in persons who used water supplies solely or principally from sources which on inspection were regarded as sanitary. These sources included public piped supplies for 27, bored wells with pumps for 28, cement cisterns for 5, and artesian wells for 5. The water used solely, principally, or occasionally by the persons who had the other 34 cases came from sources obviously exposed to contamination. These sources were

mainly shallow open dug wells with buckets, along with a few springs and a few cisterns equipped with buckets instead of pumps.

No definite evidence was obtained suggesting that the water supplies were a source of the infection. The fact that about two-thirds of the cases were in persons who were not exposed to drinking water certainly or probably contaminated is impressive. The sanitary average of the water supplies used by the persons who had poliomyelitis is estimated to have exceeded that of the water supplies used by the total population of the State.

Excreta disposal.—Thirty-six of the patients had at their homes sanitary excreta disposal systems consisting of water closets connected with public sewerage systems or well-constructed and apparently well-maintained pit privies.

The other 63 patients had at their homes more or less grossly insanitary excreta disposal systems. The majority of these systems consisted of poorly maintained open-back surface privies and the others of resort to nearby barns, stables, woods, or fields in lieu of toilets of any kind.

The finding with respect to excreta disposal, of course, might be considered as evidence of a spread of the poliomyelitis infection from the insanitary deposits of human excreta. However, it is estimated from all of the definite data available that the average of sanitary excreta disposal at the homes affected with poliomyelitis was at least equal to that for the State as a whole.

Mice.—Because of the evidence that mice are a harborage of the causative virus of choriomeningitis of persons and of the frequency of a poliomyelitis-like infection in mice generally, especially in the young, and the clinical suggestion that some of the cases reported as abortive or nonparalytic poliomyelitis in Mississippi in 1941 were cases of choriomeningitis, especial care was exercised to obtain accurate and complete evidence of mouse infestation of the homes visited.

There were no mice at the homes with 24 of the cases, few mice occasionally at the homes with 52 of the cases, and many mice usually at the homes with 23 of the cases.

Rats.—At the homes with 64 of the cases, rats were many and frequent; at the homes of 27 of the cases, rats were few and occasional, and at the homes with 8 of the cases, the families stated no rats had been observed on the premises recently and inspection of the premises, including outhouses, if any, revealed no evidence of recent rat infestation.

The difference found between rat infestation and mouse infestation at the affected homes was striking. It was not so great, however, as that found in Louisville, Ky., during the outbreak of poliomyelitis in that city in the summer and autumn of 1935 (*6*).

Especial care was exercised to obtain accurate evidence of the presence or the absence of rat infestation at the homes visited. One reason for doing so was because of the view held by some of the long-time students of the problem, including Mark Richardson and Charles Brues (7) of Massachusetts, that rats may be the main harborage for poliomyelitis infection.

Of the eight cases at homes without a history of and without objective evidence of recent rat infestation, the diagnoses were doubtful for five, the infection probably was contracted outside Mississippi (in Alabama) in one, and two were in persons who probably contracted the infection while on visits away from home in a localized area in Yazoo City, Miss., where poliomyelitis was prevalent at the time. Thus rat infestation was practically universal at the homes in which the cases of poliomyelitis occurred.

There are no satisfactory data upon which to base an estimate of rat infestation at homes throughout the entire State. It may vary considerably in different areas Rat surveys of outbreak areas and of nonoutbreak areas might prove worth while in future state-wide studies of poliomyelitis.

Rats appeared to be sufficiently conspicuous in the poliomyelitis situation in Mississippi in 1941 and also as was noted in a concurrent situation of high intensity in Walker County, Ala., to be considered and studied thoroughly as a possible animal reservoir of poliomyelitis infection.

Personal contact.—In Mississippi during the period covered by the study only three instances were reported of more than one case in a home. In each there were two cases to a home.

In the first, the onsets of the two cases were within 24 hours of each other, one on October 1, the other on October 2. In the family were the father, mother, and four children aged 9, 5, 2 years, and 8 months. The two cases were in the children aged 9 and 2 years. Both had fair complexions; the two who escaped poliomyelitis had dark complexions. The 9-year-old child and the baby had had dysentery during the summer. The home, with good sanitary and hygienic conditions, is located in the western outskirts of the city of Hattiesburg, with surroundings more rural than urban in character. Within a hundred yards down hill from the dwelling is a large polluted creek which runs from east to west through the main part of the city. Rats and mosquitoes were abundant in the immediate vicinity of the home. Except for these two cases, no others were reported in Hattiesburg.

In the second instance, the onsets of the two cases were 6 days apart, one on July 23 and one on July 29. In the family were the father, mother, and 5 children aged 9, 8, 6, 4, and 3 years. The children aged 6 and 4 years had poliomyelitis; the 9-year-old child had vague systemic symptoms, beginning July 28 and continuing for 2 or 3 days,

which may have been due to poliomyelitis infection. The home was isolated, located on a large plantation, and was very primitive in character. Rats, mosquitoes, and stable flies were abundant in and around the dwelling. Dead sparrows were found in the yard 10 to 15 days before the onsets of the cases.

In the third instance, the onsets of the two cases were 8 days apart, one on July 15 and one on July 23, in the city of Pascagoula. It will be discussed in detail in a subsequent section of this report.

Except for these instances of two cases to a home, no evidence of direct personal contact between definite clinical cases was found in the State. In one case there was a history of indirect personal contact. A woman living in the household of a child affected with the disease worked in a doctor's office and there had had contact with two or three children with poliomyelitis during the several weeks before the onset of the case in her household.

As was to be expected, histories of contact with persons having some sort of illness were obtained for a number of the cases. Fifty-one of the cases, however, were in households in which there was no history of illness of any kind in other members of the household within 3 months before or a month or more after the onset of the case of poliomyelitis. In the households affected, there were, besides the persons with the cases of poliomyelitis, a total of 211 children under 15 years of age. Besides the definite cases, there were in these households 10 cases which seemed quite probably abortive cases of poliomyelitis. Since other observers have placed so much emphasis on the probability or possibility of a zone of abortive cases around every definite clinical case, the histories of cases of illness, besides those of reported poliomyelitis obtained in the 96 homes covered in detail by this study, are given in table 3.

It is possible that a large number of these cases of illness were abortive poliomyelitis, but from the detailed histories obtained from the families and from statements obtained from the attending physicians, if any, only 10 of them appeared quite probably to have been abortive or nonparalytic poliomyelitis.

Eight of the definite cases were in persons who had been in contact at their homes, within 1 to 30 days prior to onset, with visitors who had come from outside vicinities in which poliomyelitis was more or less prevalent.

Ten persons were possibly infected through personal contact or otherwise while visiting outside their home neighborhoods in vicinities where poliomyelitis was more or less prevalent.

TABLE 3.—*Illnesses in homes with cases of poliomyelitis*

Case	Relationship to patient with poliomyelitis and age of person	Illness	Within 3 months before, a month or more after, or concurrent with onset of case of poliomyelitis		
			Before	After	Concurrent
1	Uncle, 18 yrs	Severe boils	x	x	x
2	Sister, 9 yrs	do			x
3	Mother	Diarrhea		x	
	Brother, 4 yrs	Acute coryza		x	
	Sister, 18 mos	do		x	
4	Brother, 8 mos	Dysentery	x		
5	do	do	x		
6	Mother	Acute coryza	x		
	Sister, 10 mos	do	x		
7	Mother	Tonsillitis	x		
8	Brother, 13 yrs	Acute articular rheumatism	x		x
9	Mother	Influenza		x	
10	Brother, 15 yrs	Sore throat		x	
11	First cousin, 2 yrs	Acute coryza		x	
12	Mother and father	Malaria	x		
13	Sister, 13 yrs	do		x	
14	Brother, 7 yrs	German measles	x		
		Acute coryza		x	
15	Mother	Bilious attack	x		
16	Brother, 2 yrs	Diarrhea			x
	Brother, 8 mos	Acute coryza			x
17	Brother, 15 yrs	Sore throat	x		
	Sister, 14 yrs	do	x		
18	Father	Malaria	x		
	Brother, 5 yrs	do	x		
19	Brother, 4 yrs	Fever for 3 days			x
20	Sister, 12 yrs	Measles	x		
21	Sister, 13 yrs	Acute coryza		x	
22	Brother, 3 yrs	Measles and diarrhea			x
23	Grandfather	Malaria	x	x	
24	Brother, 3 yrs	Sore throat	x		
25	Brothers, 2 and 3 yrs	Malaria	x		
26	Brother, 19 mos	Boils and acute coryza			x
27	Brother, 13 yrs	Tonsillitis		x	
28	Brother, 8 yrs	Headache and fever for 3 days	x		
29	Brother, 7 yrs	Fever for 1 day		x	
30	4 brothers	Mumps	x		
31	3 others under 10 yrs	Slight fever for 6 days		x	x
32	Father	Malaria		x	
	Brother, 17 yrs	Chills		x	
33	2 under 10 yrs	Malaria		x	
34	Father	Upset stomach (1 day)	x		
35	do	Acute coryza	x		
36	Brother, 13 yrs	Mumps	x		
	Brother, 11 yrs	Amebic dysentery	x		
37	Mother	Chills	x		
38	Brother, 10 yrs	Sore throat			x
	Sister, 6 yrs	Fever and vomiting		x	
39	Father	Malaria		x	
	Sister, 16 yrs	do		x	
40	Sister, 18 mos	Diarrhea		x	
41	Brother, 8 yrs	Dysentery	x		
	Sister, 5 yrs	do	x		
42	Sister, 7 yrs	Colitis	x		
43	Mother	Influenza	x		
44	2 sisters, 11 and 5 yrs	Acute coryza	x		
	Sister, 6 mos	Dysentery	x		x
45	Brother, 6 yrs	Headache and fever		x	
	Father	Erysipelas		x	x
	Mother and 3 brothers, 9, 6 and 3 yrs.	Acute coryza			x

LOCALIZED SITUATIONS OF SPECIAL INTEREST

In the course of the state-wide study a number of localized situations of special interest were found. Some of them are discussed sketchily herein.

Yazoo County.—The area of Yazoo County is about one-half flat delta and the remainder hilly, largely wooded region. The popula-

tion in 1940 was 40,091 with 13,832 white, 26,232 Negro, and 27 of other races.

The cases of poliomyelitis in the county outside Yazoo City in 1941, by dates of onset, race, sex, and age were as follows:

Case No.	Date of onset	Race	Sex	Age, in years	Case No.	Date of onset	Race	Sex	Age, in years
1	May 28	N	M	14	8	July 18	W	M	9
2	June 1	N	M	4	9	July 21	W	F	3
3	June 5	N	M	16	10	Aug 4	N	M	6
4	June 15	N	M	2½	11	Aug 5	N	F	4
5	June 16	N	M	2½	12	Aug 18	N	M	2
6	June 26	W	F	18	13	Aug 21	N	F	15
7	July 12	N	M	4	14	Aug 28	N	M	1¼

The first two cases found and reported were at homes about 3 miles apart in the southwestern corner of the county about 15 miles from and down the Yazoo River from Yazoo City. Cases 4, 5, 7, and 9 were at homes some miles apart in the Yazoo Valley between the homes with cases 1 and 2 and Yazoo City. Case 14 was at a home in the northern outskirts of Yazoo City. The other cases were at homes widely scattered through the eastern two-thirds of the county. There was only one case (No. 7) at a home west of the Yazoo River. It is estimated that about one-fifth of the rural population of the county is in the area west of the river. Cases 6, 9, and 13 were in persons who had been on visits to an infected area in Yazoo City and may have contracted the infection there.

There was no trace of any direct association between any two of the affected families. The majority of the cases were at isolated homes in children who during the 30 days prior to onset of illness had not been away from their immediate home vicinities and had had very little direct or indirect contact with the outside world. The contact with persons outside the immediate home vicinity usually was indirect through a visit of some older member of the family to some town for a few hours once every week or two.

Eight of the 10 cases reported in the neighboring county of Holmes were at homes located in the southwestern third of the county's area, adjacent to Yazoo County.

Yazoo City.—This city, with a population (in 1940) of 7,258, including 3,385 whites and 3,868 Negroes, and 5 of other races, is located on the eastern bank of the Yazoo River. The western third of the city area is low and flat and the remainder is hilly with the hills rising rather abruptly from the low river valley section. There is no congestion of population except in two Negro sections.

The cases of definite clinical poliomyelitis reported in Yazoo City in 1941, by dates of onset, race, sex, and age, were as follows:

Case No.	Date of onset	Race	Sex	Age, in years
1	July 1	W	M	3
2	July 14	W	F	11
3	Aug 3	W	M	7
4	Aug 6	W	F	2

In addition to these definite cases, five or six concurrent cases of probably abortive poliomyelitis were found in the city, all among white children. All of the cases, the definite ones and those probably abortive, were at homes in one limited area five short blocks long, and two blocks wide.

Case 1 was at a home facing west on Mound Street within a few yards south of Powell Street in the low flat western part of the city. Directly across Mound Street from the home was a large weedy lot containing much rubbish. At the far side of the weedy lot were a cotton compress and a railway track and a freight yard, where freight cars carrying livestock, grains, and so forth often were shifted back and forth. Across the railway track was a congested Negro quarter of unhygienic character. A drainage creek, in which mosquitoes were breeding in large number, was about 150 yards from the front of the dwelling. Directly across Powell Street was a large pasture in which horses and cows were grazed. The whole vicinity was heavily infested with rats, English sparrows, mosquitoes, stableflies, fleas, and other insects. The father and mother ran a restaurant about two blocks from the residence. The restaurant was in one of the heavily rat-infested areas of the city. The boy spent much of his time at the restaurant. His aunt, who lived in the home with him, worked in a doctor's office and there, within the 30 days before the onset of the boy's case, had been associated with two or three children brought in from the surrounding country for treatment for poliomyelitis. Thus it was evident that in this case the infection may have been contracted in any one of several ways.

Case 2 was at a home with excellent hygienic conditions and with good surroundings. Rats, however, were noted from time to time in the basement and the attic of the dwelling, and one block east was the beginning of an unhygienic, congested Negro quarter. This home was located on Powell Street east and up a hill five blocks from the corner of Mound and Powell Streets.

Case 3 was at a home on Powell Street across a street and one-half block downhill from the home with case 2. In the family were the father, mother, and the one child. The dwelling was of good construction and generally hygienic but rats and various insects were numerous on the immediate premises.

Case 4 was at a home on College Street, one block north, across a street and on a line running from south due north from the home with

case 2. This section of College Street is famed for large families with small children. The family with this case consisted of the father, mother, and four children aged 9, 6, 3, and 2 years. The 6-year-old brother of the patient with definite poliomyelitis developed, about 1 week after the onset of the definite case, a fever which continued for 3 or 4 days without any other objective symptoms. This, of course, may have been an abortive case of poliomyelitis.

There was no traceable personal association of any kind among these four families. No two of them were, through any of their members, acquainted with each other. Searching and repeated inquiries were made to discover any possible direct association between any two of them. The only possible personal contact factor found was a postman who delivered mail to all four of the homes. This postman lived in a home next door to the home with case 1, and there his wife ran a beauty parlor. He delivered mail not only in the affected area of 8 or 10 blocks, but also to 20 or 30 other blocks in which no case of poliomyelitis was found.

Case 6 of the Yazoo County series spent about 4 hours at the beauty parlor on Mound Street next door to the home with case 1 of the city series 12 days before the onset of her severe case of poliomyelitis. Two of the other Yazoo County cases and a case in Holmes County were in persons who visited nearby the home with case 1 within 5 to 15 days before the onsets of their illness. An 8-year-old boy in a home on Mound Street one-half block south from the home with case 1 developed, about 1 week after the onset of the first case, a febrile condition which continued for 5 or 6 days and which probably was a case of abortive poliomyelitis. Case 14 of the county series lived about 1 mile north from the home with city case 1. Thus it appears that there was a definite focus of infection in this localized vicinity.

Much excitement and publicity resulted from the outbreak in Yazoo City. The physicians and a highly efficient county-city health department were thoroughly vigilant, but not a case of definite clinical poliomyelitis was found anywhere in the city outside the limited area in which the 4 reported cases occurred. A house-to-house canvass was conducted by the health department in October, covering the 10 blocks comprising the area of incidence and 6 other blocks in other parts of the city, to obtain histories of all illness since June 1. In addition to the cases already known, 3 or 4 cases which quite probably were abortive poliomyelitis were found. All were in white persons residing in the area of incidence of the known definite cases.

No connection through food supplies was found except the eating of ice cream by two of the children at the same drug store. The distribution of water mains was such that no one main reached the four affected homes. All four of the homes, however, were on sewer lines discharging into one main sewer running down Powell Street. There

is a drainage ditch much frequented by rats and sparrows within 200 yards of each of the four homes. The prevailing wind is from the southwest. Mosquitoes are reported to have been unusually prevalent in Yazoo City in the summer of 1941.

This small outbreak in Yazoo City at first appears different from the concurrent intensive outbreak in Cordova in Walker County, Ala. On analysis, however, the difference seems to have been of degree rather than of kind.

Jackson.—In this city, the largest of the State, with a population of over 62,000, four cases were reported and retained on the official records as poliomyelitis for the period January 1 to December 1, 1941. One of these, terminating fatally, was a Negro girl whose onset of illness was in January. Subsequent to the original diagnosis and report by one physician, she was attended by two others who definitely diagnosed her case and gave as the cause of death in the death certificate acute articular rheumatism with endocarditis. Another case with onset of illness in August was in a tramp Negro boy who for 2 or 3 days had vague indefinite symptoms without paralysis. These two cases were eliminated for epidemiological purposes.

The two other cases were in white families of good economic status living in homes about 2 miles apart in recently developed residential sections. One of these cases, definitely paralytic, was in a baby 10 months of age; the other, diagnosed as a nonparalytic case, was in a boy 3 years of age. The onset of the first was on August 1, and that of the second was on September 25. There was no known association between the two families. Rats, *stomorys calcitrans*, and mosquitoes were very abundant in each of the home vicinities.

Pascagoula.—The only cases reported in this city were two in one white family living under fairly good economic circumstances. The family consisted of the father, aged 27 years, the mother, aged 24 years, and the daughter, aged 3 years. The daughter had onset of paralytic poliomyelitis on July 15, and the father on July 23. A roomer in the house went to Jefferson County, Ala., and from that county, where poliomyelitis was prevalent at the time, brought his bride to this home 2 weeks before the onset of the case in this home. The bride at the time of arrival had a slight cold and a sore throat. This seemed at first an impressive instance of conveyance of poliomyelitis infection through personal contact—from the bride to the child in the home and from the child to the father. Two other cases, however, developed—one with onset on September 28, and the other with onset on October 10—in children living in different parts of Jackson County outside Pascagoula. Each of these children, whose families were unknown and unrelated to each other, had grandparents whom they visited every day or two living within one block of the

home with the two city cases. This subsequent development raises a question as to whether this was an instance of conveyance of infection by person or by place. The vicinity was heavily infested with rats and mosquitoes.

Starkville.—A family consisting of the father, mother, and six children under 10 years of age, in poor economic circumstances, moved on June 27, 1941, from Montgomery County, Ala., to a house in a very insanitary section of a cotton-mill village in an outskirt of Starkville. The baby boy, aged 10 months, developed upset stomach and diarrhea a few days before they arrived in Starkville. A day or two after his arrival in Starkville, he developed paralysis. He had what appeared to be in all respects a definite clinical case of poliomyelitis. A large number of children from all over the mill village, with a population of about 1,000, were in close contact with him and his brothers and sisters. Though a close watch was kept by the mill company doctor, and by the local health officer, not another case even remotely suggesting poliomyelitis developed among any of the other persons living in the mill village. The insanitary conditions and the association of many children with the afflicted child were comparable to the situation in the area worst affected in Cordova, Ala. Measles developed in all six of the children in the family with the case of poliomyelitis about 1 week after their arrival in Starkville. From them it spread widely throughout the mill village.

CONCLUSIONS

1. The findings from this study have epidemiological significance.
2. The preponderance of the epidemiological evidence is that in Mississippi in 1941 poliomyelitis infection was spread mainly not by personal contact but by unknown factors. These factors perhaps included rats, birds, domestic fowls, or bovines as harborage, and houseflies (*Musca domestica*), stable flies (*Stomoxys calcitrans*), blowflies, mosquitoes, fleas, or other insects as vectors, and tended to operate with striking localization. On the whole a picture was presented of spread of infection by place rather than by person.
3. Epidemiological studies of this kind on a large scale, covering different neighboring communities and also widely separated regions, combined with duly directed, coordinated, and concentrated laboratory research work, would go far, probably all the way, within a reasonable period of time, toward solution of the problem of the causation of poliomyelitis.

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FIVE FUMIGANTS FOR DISINFESTATION OF BEDDING AND CLOTHING: A COMPARATIVE STUDY OF INSECTICIDAL PROPERTIES

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Fumigation has been defined as the process of liberating fumes or gases with the object of destroying insects, rats, mice, and other small animals acting as vectors of infection. In view of the present potentialities for the spread of disease during the congregation of military and civilian populations, it has seemed timely and appropriate to re-examine the properties of some of the principal fumigants and determine these properties under test conditions. It may be, too, that there will be an increasing need for the extensive use of fumigants in disinfesting fabrics and clothing coming into the United States from infected foreign territory.

In this study attention was directed to a consideration of the effectiveness of several fumigants when used to destroy insects in clothing and bedding. The chemicals chosen were those which have shown evidence of value as insecticides and have been used with reported success by public health workers.

Fumigants tested.—The fumigants tested were hydrocyanic acid, chloropicrin, methyl bromide, ethylene oxide-carbon dioxide mixture in the proportion of one part ethylene oxide to nine parts carbon dioxide, and ethylene dichloride-carbon tetrachloride mixture in the proportion of three parts ethylene dichloride to one part carbon tetrachloride.

Points considered.—In testing each of the fumigants the following points were observed:

1. Minimum lethal concentration (MLC) for insects and rats.
2. Penetration of fabrics.
3. Time exposure required for killing.
4. Safety features.
5. Effect upon fabrics.
6. Temperature as it affected insecticidal qualities.
7. Methods of application.

Mechanical equipment.—The tests were conducted under laboratory conditions in a gas-tight steel chamber having a capacity of 11.037 cubic feet and provided with special inlets permitting the introduction of accurate quantities of the fumigant studied. Provision was made for obtaining a vacuum of 25 inches or more of mercury.

Experimental conditions.—In the tests for penetrating qualities, insects were placed between layers of blanket material folded in such manner that the gas would have to penetrate each separate layer before reaching the insects. The material was of a thin cotton-wool mixture averaging 16 layers to the inch when compressed by a pressure of ⅛ pound to the square inch of surface.

Vermin used.—The insects used in determining the efficiency of the fumigants were bedbugs (*Cimex lectularius*) and cockroaches (*Blattella germanica*). The wild rats were of the Norvegicus species. These particular vermin were chosen because of their reputed resistance to fumigants. In preliminary tests it was noted that bedbugs, in varying stages of development, exhibited no demonstrable difference in resistance when exposed to the fumigants. However, only those past the third molt were used. In the case of cockroaches the adults appeared to be more resistant than the young and for that reason only adults were used. A considerable variation in the resistance of individual bedbugs and cockroaches was noted, the greatest variation being found with hydrocyanic acid and the least with chloropicrin.

The results obtained in laboratory tests with the fumigants under stated conditions are shown in tables 1, 2, and 3.

TABLE 1.—*The minimum lethal concentration and the concentration for a 100 percent kill of bedbugs by each of five fumigants, in ounces per 1,000 cubic feet, under comparable conditions*

Fumigant	M.L.C. for bedbugs in oz. per 1,000 cu. ft.			Hours of exposure	Fahrenheit temperature range	Concentration required for a 100 percent kill of bedbugs in oz. per 1,000 cu. ft.		
	Unprotected	Protected by 32 layers of blanket				Unprotected	Protected by 32 layers of blanket	
		Atmospheric pressure	25-inch vacuum				Atmospheric pressure	25-inch vacuum
Hydrocyanic acid	⅙	½	⅛	4	61° to 70°	2	4	2
Chloropicrin	3	4	4	4	65° to 72°	4	6	4
Methyl bromide	4	6	4	4	70° to 72°	6	8	6
Ethylene oxide mixture	80 at 85°	128 at 85°	80	4	80° to 85°	192	256	192
Ethylene dichloride mixture	88	192	128	4	70° to 75°	160	224	160

TABLE 2.—*The minimum lethal concentration and the concentration for a 100 percent kill of cockroaches by each of five fumigants, in ounces per 1,000 cubic feet, under comparable conditions*

Fumigant	MLC for cockroaches in oz. per 1,000 cu. ft.			Hours of exposure	Fahrenheit temperature range	Concentration required for a 100 percent kill of cockroaches in oz per 1,000 cu ft		
	Unprotected	Protected by 32 layers of blanket				Unprotected	Protected by 32 layers of blanket	
		Atmospheric pressure	25-inch vacuum				Atmospheric pressure	25-inch vacuum
Hydrocyanic acid	⅛	⅛	⅛	4	60°	2	6	2
Chloropicrin	3	4	3	4	65° to 76°	5	6	6
Methyl bromide	3	6	3	4	69° to 72°	5	8	5
Ethylene oxide mixture	80	128	80	4	79° to 85°	160	512	160
Ethylene dichloride mixture.	48	64	48	4	63° to 70°	88	160	88

TABLE 3.—*The minimum lethal concentration of 5 fumigants, in ounces per 1,000 cubic feet, for the destruction of wild rats, under comparable conditions*

Fumigant	MLC for rats in ounces per 1,000 cubic feet (unprotected)	Hours of exposure	Fahrenheit temperature range
Hydrocyanic acid	⅛	4	52° to 59°.
Chloropicrin	1	4	63°
Methyl bromide	2	4	76° to 79°.
Ethylene oxide mixture	80	4	80°.
Ethylene dichloride mixture	88	4	73°.

To obtain the data shown in the tables, 139 tests were made. These ranged from a sublethal dosage with various conditions of exposure, temperature, and protection, to the maximum dosage necessary to produce a 100 percent kill. In comparing the fumigants the period of exposure to which the insects and rats were subjected was set at 4 hours, for preliminary tests had shown that the reduced toxicity of some of the fumigants (ethylene oxide and ethylene dichloride mixtures) when applied for less than 4 hours could not be compensated by a proportionate increase in concentration. Quick action is of prime importance and a fumigant which is not capable of producing satisfactory results within 4 hours will be of restricted value. To the limit of 12 hours the effectiveness of all the fumigants was found to be in direct proportion to the period of exposure. No tests were made beyond that exposure period.

A comparison of the five fumigants led to the following observations:

1. The minimum lethal dosage of each fumigant shows no marked difference between bedbugs and cockroaches. The exposure of wild rats was made because it was believed that these animals would more nearly approximate human beings than insects in reaction to toxic gases. It will be noted that the greatest variation in the MLC between rats and the insects tested was found in the case of chloro-

picrin. This is probably due to the irritating effect of the chloropicrin on the delicate lung tissue of rats, superimposed upon the purely toxic effect.

2. The tests indicated that the penetrating qualities of the fumigants followed very closely their molecular weights. Hydrocyanic acid and ethylene oxide-carbon dioxide mixture are the least penetrating to fabrics, having molecular weights of 27, 44, 44, respectively. All the fumigants penetrated 32 layers of thin blanket material composed of a mixture of cotton and wool in a 4-hour exposure at atmospheric pressure. Chloropicrin appeared to penetrate fabrics more readily than any of the other fumigants. When a vacuum was not used, time was the essential factor in the penetration of fabrics by all gases. When a vacuum of 25 inches or more was used penetration of 32 blanket layers was accomplished by all the fumigants. In this connection a series of tests was made with chloropicrin, using a commercial steel fumigating chamber of 2,500 cubic feet capacity. A complete kill of both bedbugs and cockroaches was obtained within the center of a commercial bale of cotton, the concentration being 16 ounces per 1,000 cubic feet, with a 4-hour exposure and a 28-inch vacuum. Following a technique described in a United States Department of Agriculture publication,[1] the insects were placed in a hole drilled through the point of a long iron pin, which was then driven into the center of a bale of cotton by means of a sledge. Controls similarly placed but unexposed to gas were not injured.

3. *Toxicity.*—In proportion to its concentration, hydrocyanic acid appeared to be the most toxic of the fumigants tested, although the spread between the minimum lethal concentration needed to produce a 100 percent kill of bedbugs and cockroaches was very much greater than was found to be the case with the other fumigants tested. Chloropicrin and methyl bromide also gave a satisfactory kill within the 4-hour period of exposure. With ethylene oxide and ethylene dichloride mixtures a longer exposure was needed to obtain the full toxic effects under all conditions.

Delayed effects.—In observing the latent effect of the various fumigants on wild rats it was noted that when exposed to hydrocyanic acid they either died during or immediately after exposure or made a complete recovery, indicating that no delayed toxic effect resulted from exposure to the gas. With chloropicrin, when death of the animal did not occur during or immediately after exposure to a dosage approximating the MLC, symptoms of pulmonary irritation which lasted for several days were frequently observed. Rats recovering from such symptoms were observed for a period of 14 months during which period they appeared normal in all respects.

Following the exposure of rats to a MLC of methyl bromide, death was frequently delayed for a period of 1 to 3 days, with an occasional death much later. When recovery occurred, toxic symptoms persisted for a long time. Cockroaches and bedbugs exhibited the same delayed or prolonged toxic symptoms when subjected to a concentration of the gas considerably exceeding the MLC.

Rats exposed to ethylene oxide and ethylene dichloride mixtures in concentrations slightly less than the lethal dosage showed evidence of a delayed toxic effect by such symptoms as refusal to eat, inactivity, ruffed fur, unsteady gait, and a slow recovery extending over several weeks.

4 *Safety*—Since the safety of a fumigant frequently depends upon the ease with which it can be detected by the human senses, this quality of the fumigants was closely observed. Chloropicrin was the outstanding gas in this respect, a concentration of one-sixteenth of the MLC being unbearable to humans because of its intense lachrymatory irritation. In its gaseous form this is believed to be the safest of all the fumigants tested, although the fumigator is subjected to the

[1] Technical Bulletin No. 63, U. S. Department of Agriculture.

hazard of severe skin burns when handling chloropicrin in liquid form unless protected by rubber gloves. The fumigant presents no explosive or fire hazards.

Methyl bromide, highly toxic in its effects, has only a slight odor suggesting bromine and it is very difficult to estimate the gaseous concentration by the sense of taste or smell. Rats exposed to sublethal concentrations of the gas frequently exhibited no symptoms during the period of exposure but evidenced toxic symptoms 24 hours later as shown by reduced activity and refusal to eat. No irritation to the eyes was noted in minimum lethal concentrations. For these reasons it is considered particularly dangerous.

Neither ethylene oxide mixture nor ethylene dichloride mixture has sufficient warning qualities by which it may be readily detected by other than experienced fumigators. Frequent exposure of fumigators to sublethal concentration of these gases during the process of aeration may produce a cumulative toxic effect.

5. *Effect on fabrics.*—None of the fumigants in gaseous form were found to affect the color or texture of fabrics or noticeably to corrode metals Samples of various textiles of both vegetable and animal origin were subjected to large quantities of the fumigants in gaseous form without any deterioration being noted.

6. *Temperature.*—A low temperature was found to alter materially the efficiency of two of the fumigants, ethylene oxide and ethylene dichloride mixtures. For these fumigants a temperature of 80° F. or more was required to obtain a maximum result, although fair results could be obtained at temperatures as low as 65° F. Below the latter temperature ethylene oxide mixture was unsatisfactory. Ethylene dichloride mixture was found effective as low as 57° F with only a moderate increase of dosage.

7. All of the fumigants mentioned may be obtained commercially in liquid form in steel cylinders from which they may be sprayed into fumigating chambers or compartments, under their own pressure or that of compressed air With hydrocyanic acid and chloropicrin this method may be altered by distributing, from sealed cans, impregnated absorbent disks containing the liquid gas These cans are light in weight, easily opened, and contain from 1 to 4 pounds of liquid gas, each disk representing about ¼ ounce.

The application of methyl bromide and ethylene oxide and ethylene dichloride mixtures requires the transportation and use of heavy, cumbersome steel containers equipped with pressure gages, gas-tight valves, sprays, hose, etc , together with scales for weighing proper quantities for small chambers or compartments. With hydrocyanic acid and chloropicrin all this equipment may be dispensed with by the use of can type containers, thus resolving the problem into one of comparatively easy transportation and simple application.

When the transportation of heavy apparatus or explosive gas presents a major problem in the disinfestation of bedding and clothing of the civil population or of the armed forces, it would appear that chloropicrin is the fumigant of choice. The exercise of a little ingenuity in converting small empty buildings, packing boxes, trash cans, tents, canvas bags, etc., into fumigating devices should permit the use of chloropicrin as a disinfestation agent under conditions which might otherwise be considered adverse.

CONCLUSIONS

The choice of a fumigant will depend upon location, time, space, equipment, transportation, quality, quantity, use to which the fumigated material is put, presence of trained operators, safety features, and the kind of insects to be eradicated. When so many factors must be taken into consideration, a comparison of the value of the

fumigants tested is difficult and the results may vary somewhat according to individual judgment.

None of the fumigants tested were found to be ideal in every respect, and no single fumigant was superior under all conditions. However, in connection with bedding, clothing, and like textiles, it is believed that hydrocyanic acid and chloropicrin are the fumigants of choice. As an insecticide, chloropicrin appeared to have the most desirable qualities. It is nonexplosive and has excellent warning characteristics in sublethal concentration. Rats exposed to slightly less than lethal concentration for a period of 4 hours show no evidence of permanent pathology. The objection to this gas is mostly concerned with the necessity for ventilation following fumigation. It clings persistently to fabrics, requiring either prolonged aeration, agitation, heating, mechanical ventilation, or some combination of these factors. Unless used in an isolated building, its irritating properties necessitate an exhaust extending above the surrounding buildings. None of these objections are so serious as not to be easily overcome in a commercial fumigating vault located in large centers of population or by isolating the fumigation chamber in field disinfestation of bedding and clothing.

It would appear that chloropicrin has considerable possibilities as a delousing agent for clothing especially when war conditions require such treatment on a large scale and when suitable apparatus for the application of steam heat is not available. Moore [2] and Moore and Herschfelder [3] report the destruction of both lice and eggs in 30-minute exposures using a concentration of 4 cc. to a cubic foot of space. The same results should be obtainable by greatly reduced concentration if the exposure were increased to a 4-hour period. The writer was able to obtain satisfactory kill of the eggs of bedbugs in a concentration of 12 ounces per 1,000 cubic feet of space with a 4-hour exposure.

From a toxic standpoint, methyl bromide is an excellent fumigant for bedbugs and cockroaches. It is nonexplosive and presents no fire hazard but shows evidence of a delayed toxic effect in sublethal concentration. It is not readily detected by the senses of smell and taste. In comparatively weak concentration a toxic quantity may be inhaled without the victim being aware of exposure.

Ethylene oxide-carbon dioxide mixture proved effective as an insecticide when the test subjects were exposed to the full concentration of gas, but is somewhat deficient in penetrating qualities and requires prolonged exposure to produce results.

In comparing the relative toxicity of the ethylene oxide and ethylene dichloride mixtures, the kind of insects tested must be considered. A small percentage of both bedbugs and cockroaches proved to be extremely resistant to ethylene oxide mixture, necessitating a high

[2] Moore, Wm J Lab and Clin Med, 3 261-268 (1918).
[3] Moore, Wm, and Herschfelder, A D Univ of Minn Research Pub., Vol 8, No 4, July 1919 (86 pages).

concentration of the gas in order to secure a 100 percent kill. On the other hand, a small percentage of bedbugs appeared quite susceptible to this gas. For cockroaches ethylene dichloride mixture appeared definitely more toxic than the ethylene oxide mixture. At temperatures below 65° F. the ethylene dichloride mixture was more effective than the ethylene oxide mixture. The low toxicity of both these gases coupled with the high concentration necessary in order to obtain a satisfactory kill of insects are undesirable features when large quantities of bedding and upholstery are to be fumigated.

No new data relative to the value of hydrocyanic acid gas were developed by these tests. In the absence of a vacuum this gas did not penetrate fabrics quite as readily as chloropicrin or methyl bromide. The absence of definite warning qualities in lethal concentrations renders it dangerous to life when used by inexperienced persons. However, its high toxicity, rapid evolution from a liquid to a gaseous state, coupled with the fact that the gas approximates the weight of air and thereby promotes rapid diffusion, makes it a valuable fumigant for eradicating rodents and insects from buildings and their furnishings.

Tests other than those mentioned indicate that in the case of hydrocyanic acid the residue gas remaining in fabrics following fumigation is much greater than formerly believed. Absorption and adsorption appear to play an important role in the ability of a fumigant to penetrate fabrics.

It is suggested that in addition to the processes of absorption and adsorption there may be a reverse chemical reaction between certain gaseous fumigants and fabrics derived from both animal and vegetable fibres, which may account for a portion of retained gas.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

March 29–April 25, 1942

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the PUBLIC HEALTH REPORTS under the section "Preva-

lence of disease." The table gives the number of cases of these diseases for the 4-week period ended April 25, 1942, the number reported for the corresponding period in 1941, and the median number for the years 1937–41.

DISEASES ABOVE MEDIAN PREVALENCE

Measles.—While the number of cases (96,465) of measles was only about 45 percent of the number reported during this period in 1941, it was about 1.6 times the 1937–41 average incidence for the period. Each section of the country except the Middle Atlantic contributed to the excess over the normal seasonal expectancy, but the greatest excess was reported in the Pacific region; there the number of cases was more than 8 times the 1937–41 average incidence. Minor increases were reported from the other regions and in the Middle Atlantic region a decrease of about 45 percent was reported. During this period in 1941 the disease was most prevalent in the Middle and South Atlantic regions.

Meningococcus meningitis.—There were 390 cases of meningococcus meningitis reported for the 4 weeks ended April 25, as compared with 225, 157, and 176 cases for the corresponding period in 1941, 1940, and 1939, respectively. The number of cases was almost 75 percent above the number reported last year, which figure (225 cases) also represents the preceding 5-year average incidence for the period. While increases have been reported from widely scattered States the largest number of cases was reported from the Atlantic Coast regions, with minor excesses from the South Atlantic, West North Central, West South Central, and Pacific regions; other regions reported a slight decrease.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The incidence of diphtheria continued at a relatively low level, 872 cases being reported, as compared with 1,104 cases for the corresponding period in 1941 and an average of approximately 1,300 cases for the 5 preceding years. The situation was favorable in all sections of the country, each geographic region reporting fewer cases than normally occur at this season of the year.

Influenza.—The incidence of influenza was also relatively low. For the 4 weeks ended April 25 there were 11,481 cases reported, which number was about 65 percent of the figure for this period in 1941 and about 80 percent of the 1937–41 median incidence for the period. In the Mountain region the number of cases was about twice the seasonal expectancy and in the Pacific region there was a very insignificant increase, while in all other regions the incidence was comparatively low.

Poliomyelitis.—For the current period there were 53 cases of poliomyelitis reported, as compared with 74 for the corresponding period in 1941, this figure also representing the 1937–41 median incidence for this period. A few more cases than might normally be expected were reported from the North Atlantic regions, but in all other sections of the country the situation was quite favorable. The lowest incidence of this disease is normally reached at this season of the year.

Scarlet fever.—The number of cases (14,685) of scarlet fever was the lowest on record for this period. The New England and South Atlantic regions reported excesses over the average seasonal incidence, but all other regions reported a decline in the number of cases. The decline in the Middle Atlantic and East North Central regions was particularly significant, as this disease has been unusually prevalent in those regions in recent years.

Smallpox.—The reported cases (95) of smallpox dropped considerably below even the year 1941, when 146 cases were reported for this period. As the 1937–41 median covers a period of 3 years in which this disease was unusually prevalent, a better comparison is with the average (approximately 550 cases) but for more normal years; even then the current incidence is less than 20 percent of that figure.

Typhoid and paratyphoid fever.—For the current period there were 308 cases of typhoid fever reported, as compared with 291, 339, and 434 for the corresponding period in 1941, 1940, and 1939, respectively. While the current incidence was slightly higher than the 1941 figure, it was only about 70 percent of the average seasonal incidence. Each geographic region except the New England reported a comparatively low incidence.

Whooping cough.—The incidence of whooping cough was also relatively low, the number of cases (14,182) being about 75 percent of last year's figure and 90 percent of the average seasonal incidence (16,028 cases). The numbers of cases in the North Atlantic and East South Central regions were slightly above the average, but in all other regions the incidence was low.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended April 25, based on data received from the Bureau of the Census, was 11.8 per 1,000 inhabitants (annual basis), as compared with 12.0 for the corresponding period in 1941 and an average rate of 12.2 in the years 1939–41.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period March 29–April 25, 1942, the number for the corresponding period in 1941, and the median number of cases reported for the corresponding period, 1937–41

Division	Current period	1941	5-year median	Current period	1941	5-year median	Current period	1941	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	872	1, 104	1, 322	11, 481	17, 745	14, 019	96, 465	218, 982	59, 402
New England	22	37	32	17	27	53	9, 224	4, 929	5, 463
Middle Atlantic	132	155	229	71	154	125	10, 294	67, 213	18 818
East North Central	127	202	292	429	976	1, 074	9, 652	77, 544	4 753
West North Central	91	82	111	298	303	329	10, 319	7 223	5, 220
South Atlantic	141	176	235	3, 370	5, 060	4, 240	11, 745	34, 209	9, 332
East South Central	83	88	103	917	1, 887	1, 887	1, 634	12 154	1, 484
West South Central	184	210	203	3, 897	7, 321	4, 543	11, 735	8, 672	3, 524
Mountain	44	70	66	1, 240	706	633	5, 167	3 832	3, 777
Pacific	48	84	92	1, 242	1, 311	1, 232	26, 695	3, 206	3, 206
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	390	225	225	53	74	74	14 685	16, 960	20, 480
New England	45	14	14	2	2	1	1, 876	1, 253	1, 315
Middle Atlantic	132	52	52	12	3	8	4 269	5 470	6 845
East North Central	25	25	28	7	10	10	4 219	5 632	7, 335
West North Central	16	8	9	0	6	5	1, 576	1, 245	1 736
South Atlantic	76	56	54	10	24	18	897	871	871
East South Central	35	41	41	6	9	9	620	1, 084	562
West South Central	28	16	19	7	10	11	292	374	374
Mountain	5	2	6	5	4	4	409	451	494
Pacific	28	11	11	4	6	6	527	580	1, 006
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	95	146	1, 267	308	291	434	14, 182	18, 695	[3] 16, 028
New England	0	0	0	14	12	14	1, 573	1, 291	1, 285
Middle Atlantic	0	0	0	54	47	61	3, 724	3, 016	3, 515
East North Central	9	57	321	36	25	48	2, 902	3, 705	3, 033
West North Central	21	48	451	15	8	19	531	1, 593	859
South Atlantic	1	8	6	79	94	83	1, 467	3, 081	2, 611
East South Central	15	0	18	35	23	48	666	748	549
West South Central	43	19	44	52	50	112	798	1, 596	1, 374
Mountain	1	0	55	6	12	15	815	1, 122	852
Pacific	5	14	114	17	20	28	1, 706	2, 543	1, 963

[1] Mississippi, New York, and Pennsylvania excluded, New York City included
[2] Mississippi excluded
[3] Four-year (1938–41) average

DEATHS DURING WEEK ENDED MAY 2, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended May 2, 1942	Corresponding week, 1941
Data from 87 large cities of the United States		
Total deaths	8, 541	8, 257
Average for 3 prior years	8, 256	
Total deaths, first 17 weeks of year	153, 176	156, 493
Deaths per 1,000 population, first 17 weeks of year, annual rate	12 6	12 9
Deaths under 1 year of age	605	473
Average for 3 prior years	475	
Deaths under 1 year of age, first 17 weeks of year	9, 641	8, 966
Data from industrial insurance companies		
Policies in force	65, 234, 283	64, 542, 842
Number of death claims	12, 164	12, 336
Death claims per 1,000 policies in force, annual rate	9. 7	10 0
Death claims per 1,000 policies, first 17 weeks of year, annual rate	10. 2	10. 7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED MAY 9, 1942

Summary

Of the 9 common communicable diseases included in the following table, and for which comparable data are available for prior years, the current weekly incidence of only two—measles and meningococcus meningitis—is above the 5-year (1937–41) median. The accumulated figures to date (first 18 weeks) this year are also above the median for these two diseases.

Measles is especially prevalent, with a higher incidence than last year, in the New England, West North Central, and Pacific States. In the latter group, California reported 5,724 of the total of 23,979 cases for the current week. The 5-year median is 15,821 cases, while 39,248 cases were reported for the corresponding week last year.

The number of cases of meningococcus meningitis increased from 80 to 89, with the highest incidence continuing in the eastern States—New England and Middle and South Atlantic—and the West South Central area, especially New York (19) and Maryland (8), Massachusetts (7), Maine (6), and Texas (7).

Whooping cough, local epidemics of which have been reported from certain cities, is below the 4-year (1938–41) average for the country as a whole both for the current week and for the accumulated total to date.

The current incidence of diphtheria, scarlet fever, and smallpox is below that for the corresponding period of any prior year. Of 18 cases of smallpox, 5 cases were reported in the East North Central States and 5 cases in Texas.

Other reports include 3 cases of leprosy in Texas and 1 case in California, 10 cases of Rocky Mountain spotted fever (1 case in Missouri and the remainder in northwestern States), 15 cases of tularemia, and 28 cases of endemic typhus fever (15 in Texas and 7 in Georgia).

The death rate for 88 large cities in the United States for the current week is 11.6 per 1,000 population, as compared with 12.0 for the preceding week and a 3-year average of 11.9 for the corresponding week. The cumulative total to date this year is 12.5 as compared with 12.8 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended May 9, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred

Division and State	Diphtheria: Week ended May 9 1942	Diphtheria: Week ended May 10 1941	Diphtheria: Median 1937-41	Influenza: Week ended May 9 1942	Influenza: Week ended May 10 1941	Influenza: Median 1937-41	Measles: Week ended May 9, 1942	Measles: Week ended May 10, 1941	Measles: Median 1937-41	Meningitis (meningococcus): Week ended May 9, 1942	Meningitis (meningococcus): Week ended May 10, 1941	Meningitis (meningococcus): Median 1937-41
NEW ENG												
Maine	0	1	1		1	1	142	51	56	6	1	0
New Hampshire	1	0	0		2	-	13	48	48	0	0	0
Vermont	1	3	1			----	154	66	44	0	0	0
Massachusetts	2	4	4		-	---	1 305	848	713	7	5	0
Rhode Island	1	0	0				225	8	66	0	0	2
Connecticut	2	1	2	1		1	556	422	373	1	1	0
MID ATL												
New York	15	20	23	[1] 8	[1] 5	[1] 7	929	4 257	2 181	19	7	7
New Jersey	4	3	6	4	10	6	906	2 527	1 070	4	1	1
Pennsylvania	8	13	20	2			1 711	5 534	1 135	0	1	4
E NO CEN												
Ohio	6	6	17	7	10	10	500	4 017	1 015	0	1	1
Indiana	2	13	5	4	1	6	216	1 026	771	2	1	1
Illinois	10	30	25	4		7	396	2 013	274	0	3	3
Michigan [2]	4	4	6	1	11	3	438	3 027	661	2	2	1
Wisconsin	0	0	1	32	30	56	1,389	1 800	803	0	0	0
W NO CEN												
Minnesota	1	4	3			2	875	31	135	0	2	2
Iowa	0	0	2		17	2	259	246	253	0	0	0
Missouri	1	1	4	1	6	6	378	569	24	3	0	0
North Dakota	1	0	0		1	6	35	21	20	0	0	0
South Dakota	0	1	1		1	1	23	10	2	0	0	0
Nebraska	6	0	1	11			416	35	76	0	0	0
Kansas	5	9	6	1	7	4	557	905	509	0	0	1
SO ATL												
Delaware	1	0	0				23	98	10	1	0	0
Maryland [2]	4	2	2	11	5	7	500	356	292	8	5	2
Dist of Col	1	1	2		1		121	257	103	3	0	1
Virginia	5	4	9	143	243	114	289	1 656	490	4	4	4
West Virginia	5	10	4	19	10	20	102	621	88	2	0	3
North Carolina	4	8	8	11	1	21	543	1 688	866	0	2	1
South Carolina	1	4	4	167	213	213	141	595	55	3	0	1
Georgia	1	3	3	17	35	35	164	470	144	1	0	1
Florida	6	0	2	4	11	2	306	547	209	0	0	0
E SO CEN												
Kentucky	5	5	5	7	8	12	54	875	206	0	3	7
Tennessee	9	3	3	18	35	42	123	685	179	2	3	2
Alabama	5	6	3	49	57	57	198	391	264	3	0	1
Mississippi [2]	6	9	6							1	2	2
W SO CEN												
Arkansas	12	2	3	42	21	46	111	301	155	1	2	0
Louisiana	2	1	9	3	6	9	191	43	43	2	1	1
Oklahoma	5	6	6	43	47	74	176	190	190	2	1	1
Texas	36	16	22	407	510	365	1 293	1,106	1 070	7	2	2
MOUNTAIN												
Montana	1	1	1		4	4	81	35	35	0	0	0
Idaho	1	1	0			1	57	28	30	0	0	0
Wyoming	0	0	0	110		-	67	80	25	0	0	0
Colorado	4	9	9	45	23	4	202	526	331	0	0	0
New Mexico	1	0	0	1	1	1	35	272	111	0	0	0
Arizona	1	2	1	56	55	50	127	78	73	0	0	0
Utah	0	0	0	5	6	3	1 402	64	77	0	1	0
Nevada [2]	0	0	-	-	23	----	24	105	-----	0	0	-- --
PACIFIC												
Washington	1	0	0	5		--	377	42	47	1	1	1
Oregon	0	3	0	14	7	25	125	266	88	0	0	0
California	10	7	28	70	29	36	5,724	412	412	4	2	1
Total	197	216	295	1 323	1,453	1,411	23,979	39,248	15,821	89	54	54
18 weeks	5 075	4 952	8 180	72,359	475 735	152,532	829,134	616,866	242,810	1,400	910	910

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended May 9, 1942, and comparison with corresponding week of 1941 and 5-year median—Con

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	May 9, 1942	May 10, 1941		May 9, 1942	May 10, 1941		May 9, 1942	May 10, 1941		May 9, 1942	May 10, 1941	
NEW ENG												
Maine	0	0	0	14	12	18	0	0	0	0	0	0
New Hampshire	0	0	0	9	6	1	0	0	0	0	0	0
Vermont	0	0	0	7	3	4	0	0	0	2	0	0
Massachusetts	1	0	0	294	183	183	0	0	0	0	4	2
Rhode Island	0	0	0	12	18	12	0	0	0	0	0	0
Connecticut	0	0	0	30	67	84	0	0	0	3	2	0
MID ATL												
New York	1	3	2	408	480	769	0	0	0	4	5	6
New Jersey	0	1	0	147	287	223	0	0	0	5	1	2
Pennsylvania	1	1	1	423	402	467	0	0	0	6	4	7
E NO CEN												
Ohio	1	0	0	314	297	297	0	0	0	11	3	5
Indiana	0	0	0	71	82	107	2	1	23	0	3	1
Illinois	3	0	0	143	340	451	1	4	4	5	5	5
Michigan [2]	0	0	0	148	263	374	1	5	5	0	0	1
Wisconsin	0	0	0	167	98	131	1	7	3	0	0	0
W NO CEN												
Minnesota	0	0	0	79	39	77	0	0	10	0	0	0
Iowa	0	0	0	27	27	137	1	9	26	0	0	1
Missouri	0	0	0	55	138	138	0	1	19	0	1	1
North Dakota	0	0	0	17	5	5	0	3	3	3	2	1
South Dakota	0	0	0	21	15	14	0	0	1	0	0	0
Nebraska	0	0	0	24	12	23	0	0	4	0	0	0
Kansas	0	0	0	46	42	60	1	2	2	0	1	1
SO ATL												
Delaware	0	0	0	21	15	8	0	0	0	0	0	0
Maryland [2]	0	1	0	76	51	51	0	0	0	4	2	1
Dist of Col	0	0	0	5	5	14	0	0	0	0	0	0
Virginia	0	0	0	16	41	30	0	0	0	4	3	3
West Virginia	1	0	0	24	34	34	0	1	0	0	2	2
North Carolina	0	0	0	16	9	20	0	0	0	1	0	2
South Carolina	2	0	0	4	5	2	0	0	0	1	5	3
Georgia	1	0	1	5	19	11	1	0	0	6	4	4
Florida	0	6	1	3	1	6	0	0	0	17	12	4
E SO CEN												
Kentucky	0	0	0	45	98	45	0	0	0	7	4	4
Tennessee	0	1	0	32	66	42	0	0	0	2	7	3
Alabama	1	0	1	13	15	4	0	0	0	4	1	5
Mississippi [2]	0	2	1	6	1	3	1	0	0	2	3	1
W SO CEN												
Arkansas	0	0	1	3	6	6	2	0	0	1	2	3
Louisiana	0	1	0	1	3	5	0	0	0	5	1	7
Oklahoma	1	1	1	4	19	19	0	0	2	0	2	2
Texas	3	1	1	24	34	41	5	0	6	6	7	10
MOUNTAIN												
Montana	0	0	0	9	18	21	0	0	0	0	0	1
Idaho	0	0	0	0	6	6	0	0	3	0	1	1
Wyoming	0	0	0	17	9	11	0	0	0	0	0	0
Colorado	0	0	0	17	25	34	1	0	5	0	2	1
New Mexico	0	0	0	6	6	6	0	0	0	0	0	1
Arizona	0	0	0	6	2	11	0	0	0	0	0	2
Utah	0	0	0	11	11	11	0	0	0	0	1	0
Nevada [3]	0	0	-		2		0	0		0	1	-----
PACIFIC												
Washington	0	0	0	35	11	31	0	0	3	0	3	3
Oregon	0	1	0	7	8	17	1	0	10	1	2	0
California	2	3	3	113	117	148	0	0	11	2	4	6
Total	18	22	21	2 975	3 453	4 807	18	33	252	102	100	110
18 weeks	376	399	376	69 339	67, 562	90, 400	395	819	5, 737	1, 405	1 408	1, 990

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended May 9, 1942, and comparison with corresponding week of 1941—Continued

Division and State	Whooping cough, Week ended May 9, 1942	Whooping cough, Week ended May 10, 1941	Week ended May 9, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	30	30	0	0	0	0	0	0	0	0	0
New Hampshire	3	114	0	0	0	0	0	0	0	0	0
Vermont	24	17	0	0	0	0	0	0	0	0	0
Massachusetts	258	215	0	0	2	0	0	0	0	0	0
Rhode Island	14	15	0	0	0	0	0	0	0	0	0
Connecticut	94	51	0	0	0	0	0	0	0	0	0
MID. ATL.											
New York	474	289	0	0	4	0	2	0	0	0	0
New Jersey	341	105	0	0	0	0	1	0	0	0	1
Pennsylvania	229	362	0	0	0	0	0	0	0	0	0
E. NO. CEN.											
Ohio	288	388	0	0	0	0	0	0	0	0	0
Indiana	42	36	0	0	0	0	0	0	0	0	0
Illinois	255	99	0	0	0	0	3	0	0	1	0
Michigan [2]	139	420	0	0	0	0	0	0	0	0	0
Wisconsin	247	134	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	20	130	0	0	0	0	0	0	0	0	0
Iowa	18	65	0	0	0	0	0	0	0	0	0
Missouri	8	55	0	1	0	0	0	0	1	0	0
North Dakota	13	33	0	0	0	0	0	0	0	0	0
South Dakota	1	31	0	0	0	0	0	0	0	0	0
Nebraska	0	7	0	0	0	0	0	0	0	0	0
Kansas	36	129	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	0	1	0	0	0	0	0	0	0	0	0
Maryland [2]	52	102	0	0	0	0	0	0	0	0	0
Dist. of Col.	12	20	0	1	0	0	0	0	0	0	0
Virginia	43	90	0	1	0	31	0	0	0	0	0
West Virginia	11	46	0	0	0	0	0	0	0	0	0
North Carolina	115	300	0	0	0	0	0	0	0	0	0
South Carolina	64	148	0	0	0	0	0	0	0	0	1
Georgia	55	28	0	1	1	0	0	0	0	1	7
Florida	62	9	0	0	0	0	0	0	0	0	2
E. SO. CEN.											
Kentucky	79	59	0	0	0	0	0	0	0	0	0
Tennessee	55	64	0	1	0	0	1	0	0	2	0
Alabama	44	51	0	0	0	0	0	0	0	0	1
Mississippi [2]			0	0	0	0	0	0	0	3	1
W. SO. CEN.											
Arkansas	8	50	0	4	0	0	0	0	0	0	0
Louisiana	2	36	0	1	0	0	0	0	0	2	0
Oklahoma	2	42	0	0	0	0	0	0	0	0	0
Texas	347	300	0	5	51	0	2	3	0	1	15
MOUNTAIN											
Montana	17	17	0	0	0	0	0	0	6	0	0
Idaho	4	31	0	0	0	0	0	0	2	1	0
Wyoming	1	1	0	0	0	0	0	0	0	0	0
Colorado	18	189	0	0	0	0	0	0	1	0	0
New Mexico	29	23	0	0	0	0	0	0	0	0	0
Arizona	26	28	0	0	0	33	0	0	0	0	0
Utah	21	50	0	0	0	0	0	0	0	4	0
Nevada [2]	4	10	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	70	169	0	0	0	0	0	0	0	0	0
Oregon	19	8	0	0	0	0	0	0	0	0	0
California	283	726	0	1	0	0	0	1	0	0	0
Total	3,977	5,323	0	16	58	64	9	4	10	15	28
18 weeks	69,361	82,234	---	-------	-------	-------	-------	-------	-------	-------	-------

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended April 25, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	1	0	3	0	3	0	2	0	1	0	0	0
Baltimore, Md	0	0	3	4	382	3	10	0	30	0	0	46
Barre, Vt	0	0	0	0	0	0	0	0	0	0	0	0
Billings, Mont	0	0	0	0	10	0	1	0	0	0	0	2
Birmingham, Ala	0	0	10	1	10	0	2	0	2	0	0	1
Boise, Idaho	0	0	0	0	1	0	0	0	0	0	0	0
Boston, Mass	1	0	0	0	269	3	14	0	112	0	0	41
Bridgeport, Conn	0	0	0	0	20	0	2	0	5	0	0	2
Brunswick, Ga	0	0	0	0	5	0	0	0	0	0	0	0
Buffalo, N Y	0	0	0	0	11	0	6	0	17	0	0	3
Camden, N J	0	0	0	0	6	0	0	0	16	0	0	2
Charleston, S C	0	0	15	2	3	0	2	0	0	0	0	3
Charleston W Va	0	0	0	0	0	0	0	0	1	0	0	0
Chicago, Ill	10	0	2	1	107	1	26	0	64	0	0	101
Cincinnati Ohio	2	0	0	0	2	0	5	0	25	0	0	6
Cleveland Ohio	0	0	3	0	6	0	6	0	59	0	0	46
Columbus Ohio	1	0	1	1	49	0	7	0	9	0	0	4
Concord, N H	0	0	0	0	0	0	0	0	1	0	0	0
Cumberland, Md	0	0	0	0	0	0	1	0	0	0	0	0
Dallas, Tex	0	0	0	0	154	0	2	0	4	0	1	2
Denver, Colo	3	0	12	0	153	0	4	0	1	0	0	2
Detroit, Mich	1	0	1	2	39	1	14	0	124	0	0	65
Duluth, Minn	0	0	0	0	11	0	0	0	6	0	0	0
Fall River, Mass	2	0	0	0	38	0	2	0	37	0	0	1
Fargo, N Dak	0	0	0	0	2	0	2	0	0	0	0	0
Flint, Mich	0	0	0	0	2	0	2	0	3	0	0	1
Fort Wayne Ind	0	0	0	0	1	0	4	0	0	0	0	5
Frederick, Md	0	0	0	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	0	0	4	0	2	0	0	0	0	0
Grand Rapids, Mich	1	0	0	0	0	0	1	0	2	0	0	0
Great Falls, Mont	0	0	0	0	64	0	3	0	0	0	0	6
Hartford, Conn	1	0	0	0	52	1	2	0	3	0	0	3
Helena, Mont	0	0	0	0	0	0	0	0	0	0	0	0
Houston, Tex	2	0	0	0	106	0	7	0	1	0	0	0
Indianapolis Ind	2	0	0	2	87	0	7	0	33	0	0	19
Kansas City, Mo	0	0	0	0	147	1	6	0	34	0	0	0
Kenosha, Wis	0	0	0	0	13	0	0	0	1	0	0	11
Los Angeles, Calif	3	0	11	0	702	2	14	1	9	0	3	17
Lynchburg, Va	0	0	0	0	0	0	1	0	0	0	0	20
Memphis, Tenn	0	0	4	2	15	0	1	0	8	1	0	16
Milwaukee, Wis	0	1	1	1	123	1	1	0	41	0	0	64
Minneapolis, Minn	1	0	0	0	464	0	1	0	9	0	0	4
Missoula, Mont	0	0	0	0	0	0	0	0	1	0	0	0
Mobile, Ala	0	0	0	1	3	1	2	0	1	0	1	0
Nashville, Tenn	0	0	0	1	6	0	0	0	3	0	0	0
Newark, N J	0	0	0	1	216	0	5	0	22	0	0	35
New Haven, Conn	0	0	0	0	211	0	0	0	1	0	0	3
New Orleans, La	0	0	2	2	73	1	6	0	5	0	2	1
New York, N. Y	19	2	6	0	111	11	64	1	281	0	4	270
Omaha Nebr	0	0	0	0	228	0	1	0	0	0	0	10
Philadelphia, Pa	0	0	2	0	56	2	17	0	261	0	1	13
Pittsburgh, Pa	1	0	0	2	12	1	9	0	23	0	0	13
Portland, Me	0	0	0	0	6	0	1	0	3	0	0	6
Providence, R. I	0	0	0	0	215	0	1	0	5	0	0	14
Pueblo, Colo	0	0	0	0	6	0	0	0	0	0	0	0
Racine, Wis	0	0	0	0	150	0	0	0	3	0	0	18
Raleigh, N. C	0	0	0	1	2	0	0	0	1	0	0	0
Reading, Pa	0	0	0	0	5	0	1	0	0	0	0	2
Richmond, Va	0	0	2	0	4	0	2	0	1	0	0	1

See footnotes at end of table.

City reports for week ended April 25, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va	0	0	0	0	0	0	0	0	1	0	0	0
Rochester, N Y	0	0	0	0	7	0	3	0	3	0	0	3
Sacramento, Calif	0	0	0	0	107	0	3	0	3	0	0	27
Saint Joseph, Mo	0	0	0	0	5	0	1	0	0	0	0	9
Saint Louis, Mo	3	0	0	0	145	1	10	0	15	0	0	0
Saint Paul, Minn	0	0	0	0	263	0	8	0	4	0	0	23
Salt Lake City, Utah	0	0	0	0	83	0	1	0	2	0	0	8
San Antonio, Tex	1	0	4	1	21	0	0	0	0	0	0	0
San Francisco, Calif	1	0	0	0	373	0	12	0	7	0	0	14
Savannah, Ga	0	0	14	0	3	0	0	0	0	0	0	3
Seattle, Wash	0	0	0	0	78	1	3	0	2	0	0	31
Shreveport, La	0	0	0	0	8	0	3	0	0	0	1	0
South Bend, Ind	0	0	0	0	2	0	0	0	11	0	0	0
Spokane, Wash	0	0	2	0	39	1	4	0	2	0	0	2
Springfield, Ill	0	0	0	0	196	0	2	0	3	0	0	0
Springfield, Mass	0	0	1	0	47	0	2	0	16	0	0	2
Superior, Wis	0	0	0	0	0	0	0	0	4	0	0	5
Syracuse, N Y	0	0	0	0	169	0	3	0	2	0	1	28
Tacoma, Wash	1	0	0	0	3	0	4	0	0	0	0	2
Tampa, Fla	0	0	1	0	40	0	2	0	1	0	0	4
Terre Haute, Ind	0	0	0	1	4	0	0	0	0	0	0	0
Topeka, Kans	0	0	0	0	80	0	1	0	4	0	0	5
Trenton, N J	0	0	0	0	2	0	5	0	5	0	0	4
Washington, D C	1	0	2	1	112	1	8	0	13	0	0	13
Wheeling, W Va	0	0	0	0	8	0	0	0	0	0	0	1
Wichita, Kans	0	0	1	0	91	0	5	0	4	0	0	0
Wilmington, Del	0	0	0	0	3	0	5	0	2	0	0	0
Wilmington, N C	0	0	0	0	7	0	2	0	0	0	0	0
Winston Salem, N C	0	0	0	0	29	0	0	0	0	0	0	0
Worcester, Mass	0	0	0	0	7	0	8	0	13	0	0	51

Anthrax—Cases Philadelphia, 1
Dysentery, amebic—Cases Chicago, 1, New York, 3, Philadelphia, 1
Dysentery, bacillary—Cases Dallas, 1, Los Angeles, 2, New York, 5
Leprosy—Cases Los Angeles, 1, Spokane, 1
Tularemia—Cases Memphis, 1
Typhus fever—Cases Houston, 1, New York, 1, Terre Haute, 1
Undulant fever—Cases Grand Rapids, 1

Rates (annual basis) per 100,000 population for the group of 89 cities in the preceding table (estimated population, 1942, 34,002,348)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
Week ended Apr 25, 1942	8 89	15 80	4 14	965 65	55 82	212 54	0 15	2 15	183 25
Average for week, 1937-41	14 70	26 16	7 43	[1]713 72	83 58	286 51	2 63	2 79	190 39

[1] Median.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—A rat found on February 28, 1942, and another rat found on March 25, 1942, both in Paauhau, Hamakua District, Island of Hawaii, T. H., have been proved positive for plague.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended April 11, 1942.—During the week ended April 11, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		5		2	5			1	7	20
Chickenpox		3		105	186	33	27	18	129	501
Diphtheria		25		19	3	7	3		1	58
Dysentery				2					2	4
German measles		3		20	69	12	12	4	30	150
Influenza		28			27	3			14	72
Lethargic encephalitis				2						2
Measles		1		168	185	180	7	15	18	574
Mumps	1	20		403	387	89	109	42	376	1,427
Pneumonia		27			20	3	1		14	65
Poliomyelitis			11							11
Scarlet fever	8	25	3	109	255	41	10	86	30	567
Smallpox							1			1
Trachoma								1		1
Tuberculosis	1	9	10	58	50				48	176
Typhoid and paratyphoid fever				15	6				1	22
Undulant fever					1				1	2
Whooping cough		7		75	46	1	8	2	30	164
Other communicable diseases		9		2	232	111		1	10	365

JAMAICA

Communicable diseases—4 weeks ended April 11, 1942.—During the 4 weeks ended April 11, 1942, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		1	Poliomyelitis		2
Chickenpox	41	8	Scarlet fever		1
Diphtheria	1	8	Tuberculosis	29	74
Dysentery	3	1	Typhoid fever	4	34
Leprosy	1	2	Typhus fever	5	

SWEDEN

Notifiable diseases—January 1942.—During the month of January 1942, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	11	Poliomyelitis	21
Diphtheria	39	Scarlet fever	1 581
Dysentery	31	Syphilis	27
Epidemic encephalitis	1	Typhoid fever	9
Gonorrhea	1 006	Undulant fever	1
Paratyphoid fever	17	Weil's disease	8

SWITZERLAND

Notifiable diseases—January 1942—During the month of January 1942, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	16	Paratyphoid fever	4
Chickenpox	160	Poliomyelitis	40
Diphtheria	109	Scarlet fever	247
German measles	20	Tuberculosis	219
Influenza	45	Typhoid fever	2
Measles	602	Undulant fever	4
Mumps	182	Whooping cough	117

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above mentioned diseases, except yellow fever, during the current year All reports of yellow fever are published currently

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month

Cholera

Ceylon.—During the week ended April 4, 1942, 1 case of cholera was reported in Ceylon.

Typhus Fever

Algeria.—During the period April 1–10, 1942, 2,151 cases of typhus fever were reported in Algeria (263 cases in Algiers). During the period March 21–31, 1942, 2,473 cases were reported in Algeria (113 in Algiers).

Bulgaria.—For the week ended April 11, 1942, 33 cases of typhus fever were reported in Bulgaria.

France.—During the week ended April 25, 1942, 11 cases of typhus fever were reported in Marseille, and 1 case in Nice, France.

Hungary.—During the week ended April 18, 1942, 47 cases of typhus fever were reported in Hungary. For the preceding week 49 cases were reported.

Morocco.—During the week ended April 18, 1942, 1,376 cases of typhus fever were reported in Morocco.

Rumania.—During the week ended April 25, 1942, 171 cases of typhus fever were reported in Rumania.

Spain.—During the week ended April 11, 1942, 96 cases of typhus fever were reported in Spain (37 cases in Barcelona).

Yellow Fever

Ivory Coast—Divo Subdivision.—On April 28, 1942, 1 death from suspected yellow fever was reported in Divo Subdivision, Ivory Coast.

COURT DECISION ON PUBLIC HEALTH

City held not liable for death of child on sewage disposal plant.—(Pennsylvania Superior Court; *Krepcho et al.* v. *City of Erie et al.*, 21 A.2d 461; decided July 26, 1941.) The plaintiffs brought an action against the city of Erie and certain of its officers to recover damages for the death of their 5-year-old son. The child was crushed to death between a large horizontal iron valve wheel and a slowly rotating platform of an outdoor clarifier tank, which were parts of a sewage disposal plant owned and operated by the city. The premises on which the disposal plant was situated were accessible either by a private road through a State soldiers' and sailors' home or by trespassing over the land of a railroad company. In order to get to the place where the death occurred the boy had to climb fifteen steps or mount a high bank and then ascend a 4-foot perpendicular ladder. The plaintiffs' evidence showed that, since the erection of the disposal plant, children frequently visited and used portions of the city's land and the rough grass plot owned by the railroad company immediately adjacent thereto as a playground and that, at intervals, they were seen on top of the machinery near the edge of the tanks where the valves were located. There was also testimony that adults and children trespassed daily across the city's premises in going fishing, boating, bathing, skating in season, gathering tomatoes which grew in the sludge, and carrying away the sludge of the sewage for fertilizing purposes.

The superior court held that the city was not liable, taking the view that it could not be said that the sewage disposal plant was an attractive nuisance and that the city was required to anticipate that a venturesome boy would be fatally injured by the machinery it had erected. While the land owned by the railroad company was generally

used as a place of recreation, the disposal plant, which, with the outfall sewer, cost about $2,000,000, could not, according to the court, be said to be for that purpose. Assuming that the not easily accessible machinery would attract curious children, its maintenance and operation were not equivalent to an invitation to go upon it. The doctrine of attractive nuisance was said by the court to be applicable only when there was proof that the appliance or condition in question was so accessible that it should be reasonably anticipated that children would come to it. The possibility of children reaching it was not enough. The court further stated that, while it was true that children did go upon the machinery involved in the instant case, the evidence showed that they were ordered away when discovered thereon. "The deceased boy when injured was at a place not easily accessible where he had no right to be."

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R COFFEY, *Assistant Surgeon General, Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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Public Health Reports

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DOMESTIC WATER AND DENTAL CARIES [1,2]

IV. Effect of Increasing the Fluoride Content of a Common Water Supply on the *Lactobacillus acidophilus* Counts of the Saliva

(Preliminary Report)

By FRANCIS A. ARNOLD, Jr., *Passed Assistant Dental Surgeon*, H. TRENDLEY DEAN, *Dental Surgeon*, and ELIAS ELVOVE, *Senior Chemist, United States Public Health Service*

During the past few years epidemiological studies have pointed out an inverse correlation between the amount of dental caries and the presence of fluorides in the domestic water supplies (*1*, *2*, *3*). Recently Dean, Jay, Arnold, and Elvove (*4*) presented evidence indicating that teeth calcified on a high fluoride water seemingly retained an increased resistance to dental caries even though they had been under the influence of a fluoride-free [3] water for 12 years immediately preceding the examination. These studies and others have indicated the possibility of partially controlling dental caries through the public water supply. This possibility was further enhanced by the findings in the study of 8 suburban Chicago communities (*3*). For instance, at Aurora (Ill.) the dental caries inhibitory factor, presumably present in the water and probably fluoride, was operative at levels (1.2 p. p. m.[4] of F) where mottled enamel per se was of minimal public health and no esthetic significance. At present, however,

[1] From the Division of Infectious Diseases with the cooperation of the Division of Chemistry, Nationa Institute of Health.

[2] Preceding papers in this series are

Dean, H. T., Jay, P., Arnold, F. A., Jr., and Elvove, E.: Domestic water and dental caries. I. A dental caries study, including *L. acidophilus* estimations, of a population severely affected by mottled enamel and which for the past 12 years has used a fluoride-free water. Pub. Health Rep. 56.365–381 (1941).

Dean, H. T., Jay, P., Arnold, F. A., Jr., and Elvove, E.: Domestic water and dental caries. II. A study of 2,832 white children, aged 12–14 years, of 8 suburban Chicago communities, including *Lactobacillus acidophilus* studies of 1,761 children. Pub. Health Rep., 56: 761–792 (1941).

McClure, F. J.: Domestic water and dental caries. III. Fluorine in human saliva. Am. J. Dis. Child., 62: 512 (1941).

[3] The term "fluoride-free" is used in this report for waters containing less than 0.2 p. p. m. F—experimental error of F determination is 0.1 p. p. m.

[4] P. p m. = parts per million.

there is no direct evidence demonstrating whether or not the addition of fluorine to a fluoride-free common water supply will decrease the incidence of dental caries in the community. The epidemiological evidence seemingly justifies the assumption that dental caries activity in humans is markedly inhibited by drinking waters of fluoride concentrations no higher than about the minimal threshold of mottled enamel. Actual field experiments, however, are necessary to determine what age groups might thus benefit, how long ingestion must continue before dental caries activity decreases, and numerous other aspects of this phenomenon as it operates in human populations. An opportunity to study a few of these aspects recently presented itself. This paper is a preliminary report of what may be a long-term study.

Garrettsville, a small village in the northeastern section of Ohio, recently changed its public water supply. Prior to November 1939, the village water supply was obtained principally from three wells, the fluoride (F) content of which was about 0.1 p. p. m. In November 1939, a new well was put into service; the water from this well contains about 1.7 p. p. m. of fluoride (F). Mixture of the water from these wells resulted in a domestic water of about 0.7 p. p. m. F. An opportunity was therefore presented to study children whose domestic water was changed from one practically free of fluorides to a water containing this element in a range previously found (*3*) beneficial to children using such waters throughout life.

DESCRIPTION AND MINERAL COMPOSITION OF THE GARRETTSVILLE WATER SUPPLY

From 1924 to 1939 the water supply for the village was obtained from three drilled wells (Nos. 2, 3, 4), each 8 inches in diameter and approximately 50 feet deep, located about 1.5 miles northeast of the village. The well supply was supplemented during the spring months by water from a spring located in the same general area. This supply was abandoned in 1937. In November 1939 a new well (No. 1), 8 inches in diameter and 210 feet deep, was placed in service. Because of the fluoride content of the water from well No. 1, the water from this source is mixed with water from two of the other wells. On the average day, well No. 1 is pumped 8 hours and delivers approximately 65 gallons per minute and wells Nos. 2 and 3 are pumped 10 hours and deliver 45 to 50 gallons per minute. Since the beginning of the study, well No. 4 has been used only occasionally and at present is not used at all.

The water obtained from these wells is treated in an iron-removal plant. This plant comprises an aerator, a settling tank divided into four units operating in series, and two gravity type rapid sand filters. Water is pumped directly from the wells to the treatment plant

from where it flows by gravity to the clear well. High service pumping equipment pumps water directly from the clear well to the storage reservoir. All the water supplied to the town comes from this one storage reservoir. The present water consumption of the village ranges from 70,000 to 105,000 gallons daily.

TABLE 1 —*Analyses of the waters used at Garrettsville, Ohio*

[In parts per million [1]]

	Well No 1	Well No 2	Well No 3	Domestic tap
Residue on evaporation	858 4	156 0	165 6	406 4
Loss on ignition	36 8	36 0	36 0	28 0
Fixed residue	821 6	120 0	129 6	378 4
Silica (SiO_2)	18 4	18 0	16 0	20 0
Iron (Fe)	04	0	04	05
Aluminum (Al)	0	0	0	0
Calcium (Ca)	11 4	24 3	26 9	15 7
Magnesium (Mg)	1 4	7 4	8 9	7 4
Sodium and potassium (calculated as Na)	332 2	7 4	7 0	130 2
Carbonate (CO_3)		-	4 8	-
Bicarbonate (HCO_3)	529 5	89 0	68 3	247 6
Sulfate (SO_4)	6 6	23 9	42 8	17 3
Nitrate (NO_3)	0	5 3	5	2 1
Chloride (Cl)	220 5	2 5	2 0	85 0
Phosphate (PO_4)	0	0	0	0
Fluoride (F)	1 7	[2] 1	[2] 2	[3] 8

[1] The samples from wells Nos 1 and 2 were received Jan 15, 1940 those from well No 3 and the domestic tap were received Feb 27, 1940 Assistant Chemist C G Remsburg carried out the determinations other than fluoride, using mostly the methods given in the Standard Methods of Water Analysis of the American Public Health Association The fluoride determinations were made by Senior Chemist E Elvove using the colorimetric Zirconium-Alizarin method (Pub Health Rep , 48 1219 (1933))

[2] 3 other monthly samples show 0 1 p p m F

[3] The mean fluoride (F) content of 12 monthly samples of the domestic tap was 0 7 p p m (range 0 5–0 8).

PLAN OF STUDY

The present study group is composed of white public school children living within the corporate limits of the village and using the public water supply for all domestic purposes. Only children in the fourth to tenth grades were included in the study. Their ages ranged from 9 to 17 years at the beginning of the study, the average being 13 years. The original group included a total of 132 children, but due to absentees, migrations, and other uncontrollable factors, only 109 were followed for the complete year of study. All 109 children were living in Garrettsville prior to the change of water.

BACTERIOLOGICAL STUDY AND RESULTS

The technique followed in obtaining *L. acidophilus* counts was similar to that used in other studies in this series (*2*, *3*, *4*). Paraffin stimulated saliva samples were collected between 10.30 and 11:30 a. m. The time allowed for collection of saliva was approximately 5 minutes in all cases. The dilution used throughout was 1 cc. saliva to 4 cc. broth; 0.1 cc. of the broth and saliva mixture was placed on tomato juice agar, pH 5.0. All samples were collected at the school and were taken that same day to the Institute of Pathology,

Western Reserve University, Cleveland, Ohio, where they were plated and incubated. During the year 1940–41, eight separate saliva samples were collected from each child (two in May, three in November, three in April) and counts determined. The results of these eight examinations are shown in table 2.

TABLE 2.—*Summary of the distribution of oral L. acidophilus in 8 individual saliva samples from a group of 109 school children, Garrettsville, Ohio, during a 1-year period*

Date of collection	Distribution of children according to the estimated number of oral *L. acidophilus* per cubic centimeter of saliva								
	Negative	Less than 100	100 to 1,000	1,000 to 3,000	3,000 to 12,000	12,000 to 21,000	21,000 to 30,000	30,000 and over	Total
	NUMBER								
May 14, 1940	6	11	3	3	8	12	8	58	109
May 15, 1940	6	12	6	3	6	11	8	57	109
Nov. 12, 1940	11	4	10	2	9	16	4	52	108
Nov. 13, 1940	11	3	10	3	9	5	6	61	108
Nov. 14, 1940	13	4	5	4	6	5	5	63	105
April 14, 1941	8	7	2	0	8	7	5	68	105
April 15, 1941	9	3	1	1	13	4	3	72	106
April 16, 1941	11	1	1	2	10	6	4	71	106
	PERCENT								
May 14, 1940	5.5	10.1	2.8	2.8	7.3	11.0	7.3	53.2	
May 15, 1940	5.5	11.0	5.5	2.8	5.5	10.1	7.3	52.3	
Nov. 12, 1940	10.2	3.7	9.3	1.9	8.3	14.8	3.7	48.1	
Nov. 13, 1940	10.2	2.8	9.3	2.8	8.3	4.6	5.6	56.5	
Nov. 14, 1940	12.4	3.8	4.8	3.8	5.7	4.8	4.8	60.0	
April 14, 1941	7.6	6.7	1.9	0	7.6	6.7	4.8	64.8	
April 15, 1941	8.5	2.8	.9	.9	12.3	3.8	2.8	67.9	
April 16, 1941	10.4	.9	.9	1.9	9.4	5.7	3.8	67.0	

Previous studies in this series (*2*, *3*, *4*) have indicated a correlation between the dental caries experience of the group and the *L. acidophilus* counts. In these studies group differences were found principally in the percentages of low counts (negative and less than 100) and high counts (30,000 and over). The results of one of these studies (*3*) present evidence that there is a group difference in *L. acidophilus* counts of saliva from children who were born and reared in a community where the water contained 0.5 p. p. m. fluorides (F) (Elgin, Ill.) when compared with counts from children who were continuously exposed to a fluoride-free water (Waukegan, Ill.). In order to compare the bacteriological results of the present study obtained at three different periods of the year with the results obtained at Elgin and Waukegan, Ill., the percentage of low and high *L. acidophilus* counts[5] are shown graphically in figure 1.

[5] In order to make the data comparable, the percentages shown for the low and high *L. acidophilus* counts at Garrettsville are those obtained on the first day of each study period.

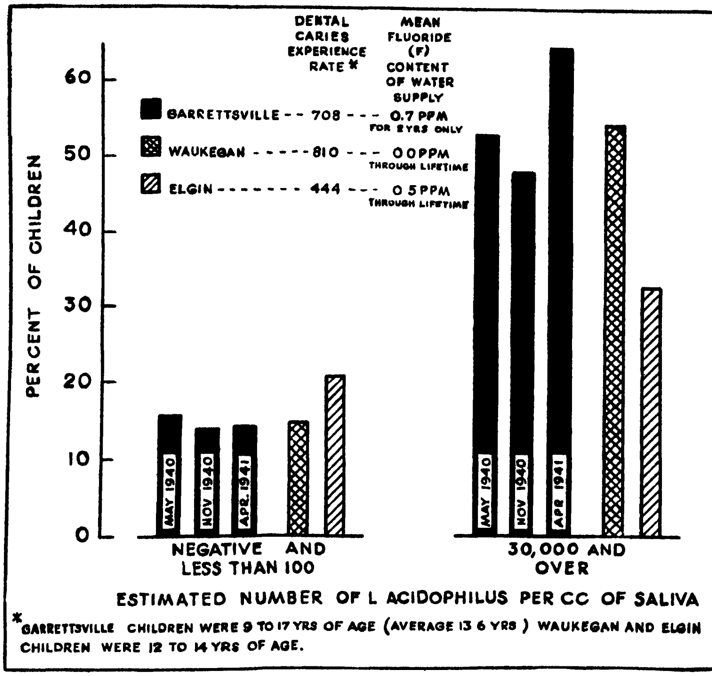

FIGURE 1.—A comparison of the low and high *L acidophilus* counts obtained at Garrettsville, Ohio, with counts obtained at Waukegan and Elgin, Ill. The results shown for Garrettsville are those obtained on the first day of each visit during the study year.

CLINICAL EXAMINATION AND RESULTS

In order to have some measure of the prevalence of dental caries in this group of children, a complete dental examination was made in December 1940. This examination was made by use of mouth mirror and explorer in a well-lighted schoolroom with the child seated and facing a window. The criteria for making a diagnosis of dental caries were the same as used in previous studies (*2*, *3*). In computing the dental caries experience no tooth was counted more than once, even though it had a filling on one surface and an untreated lesion on another.[6] The principal findings of the clinical examination are shown in table 3

DISCUSSION

The results of the single clinical examination given in table 3 record the dental caries experience of the permanent teeth of the study group up to the time of examination. Considering the average age of these children when examined (13.6 years) and their caries experience rate (708), it seems logical to assume that they have had a somewhat similar caries experience to that observed in children born and reared

[6] Any tooth showing evidence of a filling was classified as a filled tooth.

in communities in which the water is practically free of fluorides (*3*).[7] The low incidence of dental fluorosis (1.8 percent) is similar to the sporadic instances of "very mild" mottled enamel found in children who have calcified their teeth on water which is practically free of fluorine. In view of this evidence one might assume that up to the time of change in water supply this group of children at Garrettsville had an oral environment comparable to children born and reared in communities with practically fluoride-free waters.

TABLE 3.—*Summary of the clinical findings observed in an examination of 107 white school children, aged 9 to 17 years, at Garrettsville, Ohio*

Dental caries experience, permanent teeth						Macroscopic evidence of endemic dental fluorosis		
						Absent		Present
Teeth filled (past dental caries) (a)	Teeth with untreated dental caries (b)	Teeth, extraction indicated (c)	Teeth, missing (d)	Total (a+b+c+d)	Proximal surfaces 4 superior incisors	Normal	Questionable	Very mild
Number per 100 children examined					Number per 100 surfaces	Percent		Percent
361	284	16.8	46.7	708	12.7	83.2	15.0	1.8

In order to obtain direct evidence of a change in caries activity in a study of this nature, especially with such limited numbers, it will be necessary to make repeated clinical examinations. Such a plan necessarily requires sufficient time to elapse between examinations so that comparisons can be made on the basis of similar age groups with like exposure to risk of caries under the changed environment (new water supply). A presumptive indication of any significant change in caries activity of the study group might be gained by use of *L. acidophilus* counts as a measure of caries activity.[8] Previous studies in this series indicate that a negative correlation exists between the caries activity of a group population, as measured by the percentage distribution of *L. acidophilus* counts, and the presence of fluorides in the public water supplies. Attention may be called, however, to the fact that in the studies cited only children 12 to 14 years of age, *who had been continuously exposed to the respective waters throughout life,* were included in the study groups.

In view of the clinical results (as to the amount of dental caries)

[7] The dental caries experience rate of 1,008 children examined in Evanston, Oak Park, and Waukegan, Ill., in the study cited was 746 However, it should be noted that the range of ages in the present study (9 to 17 years) is different from that of the children referred to in these 3 cities.

[8] For more complete discussion of the relationship of *L. acidophilus* and dental caries activity, reference may be made to Dental Science and Dental Art, Chapter 10 (*5*).

in the present study group, and the bacteriological results in previous studies, one might expect that had there been an immediate beneficial change in caries activity between the date of change of water supply (November 1939) up to the beginning of the study (May 1940) the *L. acidophilus* counts would be changed. In other words, there would have been an increase in the number of low counts (0 or less than 100) and a decrease in the high counts (30,000 and over). However, the counts obtained in May 1940 indicate that no such change had occurred. The *L. acidophilus* counts at the beginning of the study would indicate that the caries activity of the group was similar to that found at Waukegan, Ill., (*3*) where the children studied had been continuously exposed to a fluoride-free water and had a similar high dental caries experience rate.

If a decrease in caries activity of the study group occurred during the year, the bacteriological results might be expected to have given some indication of this change. Had there been an increase in the number of low counts or a significant decrease in the number of high counts, a beneficial change in caries activity might have been assumed. This bacteriological change did not occur. If any change in caries activity might be inferred from the minor changes in the bacteriological counts, it would suggest a change toward a higher percentage of the children having active dental caries. According to the results shown in table 2 there was an average of 16.1 percent low counts in May 1940, and 12.3 percent low counts in April 1941; however, at present these changes cannot be considered significant.

The results obtained so far in this study might be interpreted as showing that increasing the fluoride content of a public water supply from 0.1 to 0.7 p. p. m. F will have little influence on dental caries activity for at least the first 2 years. In comparing the results of this study with previous studies in this series, one might infer that it is necessary that the individual be born and reared in a community having water of this approximate fluoride content in order to obtain any beneficial effects. It should be noted, however, that the group of children in Garrettsville have been using this new water supply for a comparatively short time and it is possible that the *L. acidophilus* counts obtained represent caries activity in lesions which started prior to the change in water.

SUMMARY

There are presented preliminary results obtained in a study of 109 public school children who have been exposed for about 2 years to a domestic water which has been increased in fluoride (F) content from about 0.1 to 0.7 p. p. m.

A single clinical examination indicated that the dental caries experience rate of these children was similar to the rates reported in previous studies on children who were born and reared in communities where the domestic water is practically free of fluorides.

There is no indication according to the percentage distribution that the increased fluoride content of the water supply has as yet influenced the *L. acidophilus* counts. Such results might indicate that at least for the first 2 years increasing the fluoride (F) content of a public water supply from 0.1 p. p. m. to approximately 0.7 p. p. m. would result in little, if any, decrease in caries activity of children whose teeth had calcified and had been exposed for a number of years to a water practically free of fluorides. However, the relatively unchanged *L. acidophilus* counts in this group may be the result of dental caries activity in lesions which had started prior to the change of water and were still active, and subsequent clinical examinations may possibly show that fewer new carious lesions have developed since the introduction of the new water supply.

ACKNOWLEDGMENTS

The authors desire to express their appreciation to J. A. Ricker, superintendent of water works, Garrettsville, Ohio, for his cooperation in maintaining the mixture of well waters at a constant level during this study; also to J. O. Fox, superintendent of schools, for continued cooperation throughout the study. Thanks are also expressed to officials of the Ohio Department of Health and the Portage County Health Department. Special thanks are likewise expressed to the Institute of Pathology, Western Reserve University, for providing the facilities for conducting the bacteriological studies.

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HOUSING OF HEALTH DEPARTMENTS[1]

By JOSEPH W. MOUNTIN, *Assistant Surgeon General, United States Public Health Service*

As chief of the States Relations Division of the United States Public Health Service, it is my duty as well as my privilege to visit many local health departments throughout the country. From these visits I derive valuable information regarding the status of health organization at the all-important local level. It is gratifying to be able to report that the zeal and devotion to duty frequently displayed by the guardians of community health cannot be praised too highly.

There is, however, one circumstance which never fails to astonish and depress me whenever I undertake a trip into the field—that is, the unsuitable, and often deplorable, condition of the quarters in which many local health departments are housed

Upon entering a community, I proceed directly to the basement of the city hall, or to the basement of the courthouse if the visit is being made to a county health department This is done with reasonable assurance that the health department will be found there. Occasionally my assumption will be wrong— the health department will be in the attic instead of in the basement If it is not in either place I am at a loss because more likely than not it is situated in some out-of-the-way alley. Extended inquiries may be necessary to find someone who will attempt to direct me. Frequently I cannot follow the instructions, and am reduced to asking my informant if he will take me there personally.

Upon arriving at the health department, what do I find? If the quarters are rented, I descend— or climb a stairway which is a hazard to life and limb, and enter a structure which meets no standard building code requirements. If the unit is in a courthouse or city hall, the stairway and building are probably substantial enough, but the entrance is apt to be equally forbidding. A motley fraternity of loafers sprawl or loiter persistently about the entrance, subjecting every client or visitor to idle but thorough scrutiny. In the corridors, inadequate lighting mercifully obscures the walls, floor, and woodwork which are spattered with tobacco juice and adorned with the jack-knife carvings of a past generation.

Although the department's own quarters may present a more sanitary aspect, they were obviously not designed for a health unit. There is not enough space for desk work, to say nothing of a clinic and other essential accommodations. Ingenious partitioning devices and curtains may be employed to achieve a modicum of privacy. The furniture is a collection of "cast offs" assembled from heaven

[1] From the States Relations Division.

knows where. Being a person of some weight I often have trouble selecting a chair that looks substantial enough to hold me.

The foregoing is a harsh indictment. Lest I be considered guilty of exaggeration I will cite specific but anonymous cases. The following paragraphs contain authentic, and I may even say typical, descriptions of local health units which I have recently visited.

In one of the larger cities of the South the health unit is housed in an ancient structure formerly used as a school. The building is regarded as a fine old antique, and so, apparently, is the health department. When the school authorities abandoned the building because it was so old and dilapidated, it was placed at the disposal of the health department. No questions were asked regarding its suitability. Indeed, general opinion held that the department was now most bountifully provided for. It has an entire building for itself—an almost unheard of stroke of good fortune!

Lacking regular equipment, the health officer put his inventive talents to work and fashioned a collection of gadgets, deriving, it would seem, many of his concepts from the drawings of a well-known cartoonist. As he exhibited these makeshift wonders, which only he knew how to operate, he manifested great pride in his achievement.

In another southern community the health unit is lodged in the courthouse basement together with the county jail and the only public toilet facilities in the city. This town is now a haven for thousands of soldiers on leave and it is impossible to keep the basement orderly and clean. A dark and dreary clinic waiting room, fitted with rows of old theater seats, is flanked by the cells in which prisoners are kept.

Some years ago, while stationed in Missouri, I was instrumental in arranging for the location of two county health departments in buildings prior to their erection. One department was fairly well provided for in the county courthouse, the other in a county hospital. Here at last was evidence of enlightened policy, and I felt as if I were being granted a glimpse into the future. Recently, however, I visited these scenes of my former triumphs, only to be gravely disappointed. Both units had fared badly. In the case of one, the prosecuting attorney had decided that the rooms it occupied would exactly suit his purposes. Accordingly, the health department had been moved into the basement. It did not, however, stay there long; soon it was crowded out to allow space for the county records. The unit located in the county hospital had retained only one room of its original suite on the first floor, and most of its furniture had been strung out along the hallway leading to the basement where the clinics are now located.

Such successive pillar-to-post treatment has been the lot of many

local health units. There is a health department which uses the jury room of the courthouse. When a jury files in to deliberate, the health department simply stops whatever it is doing and gets out. An attempt is made to maintain a full schedule of field work during the time the jury is in session. I recall a Virginia city with more than 30,000 population where the health department has taken refuge on the mezzanine of the armory. Clinic patients use the sloping gallery as a waiting room There is a unit in North Carolina which has been crowded out of the city hall proper and onto the porch. The clinic of this unit is in the basement where the city formerly locked up its drunks. Now the drunks are housed in new and better quarters, and the space has graciously been made available to the health department.

There seems to be an unremitting fate which consigns health officers and health workers to basements. They even go to school below ground level. One of the Nation's foremost schools of public health has recently been given space in a new and well constructed university building—in the basement. As usual the basement is crowded—much more so than the upper floors.

One health department visited in New Jersey is lodged in a weather-beaten shack set on poles. The wind whistles up through the cracks in the single layer of board flooring. There is no running water possible because pipes would freeze if they were installed. I am reasonably certain that the unit would be without toilet facilities if a public-spirited group of citizens had not supplied the materials, and WPA the labor for a pit privy in the backyard.

Another local department in a southeastern city with more than 50,000 population has its quarters in various parts of the municipal market center. In summer the odors emanating from the market stalls are particularly distressing. All day long the place is in a tumult with the shouting of hucksters and the cackling of poultry confined in crates piled high on the sidewalk.

A local health unit in a southwestern State has succeeded in getting quarters that are quite satisfactory when judged solely by the appearance of the interior. But the building entrance and the immediate surroundings are like something out of a bad dream. On one side is a combination "juke joint," grill, and pinball emporium; on the other a produce warehouse. From the left comes the odor of frying hamburger and onions; from the right, the stench of semi-decayed vegetable matter. A raucous and constant din issues from the juke box next door. Upon my first visit, as if the combination of odors and sounds was not enough to discourage me, a large rat scurried across my path when I approached the building. Incidentally, the town has been a focus of endemic typhus fever for several years.

I have in mind another local unit which has been crowded into a temporary frame structure in a downtown alleyway. The windows look out at the overflowing garbage pails and miscellaneous rubbish discarded by a square block of restaurants and stores.

It is not pleasant to dwell at length on scenes such as these. But I have purposely done so to emphasize one fact: *The imagination can scarcely conceive of conditions worse than those found in the headquarters of the very agencies which ought to set an example of civic cleanliness and decency.* It should be pointed out that the health departments whose quarters are described above are full-time, professionally staffed organizations, not part-time units from which a certain amount of laxity might be expected.

What is needed to correct this disgraceful state of affairs? The answer usually given is, "money." Yet this is not the whole truth; there are certain fundamentals even closer to the heart of the matter. If local health departments have not been granted funds to operate according to twentieth-century standards, the fault lies partly with the departments themselves. A probability is that they have not asked for money, or that they have not been aggressive enough in pressing their claims; somehow health departments seem to derive great satisfaction out of being considered and treated as martyrs. Or, probably their programs do not meet community needs. No public agency can expect public support unless (1) it has convinced the community that it is doing a really important and worth while job, and unless (2) it commands respect for the way it is doing it.

Many local health departments have too narrow a conception of their functions and duties. They routinely perform the old-line tasks such as inspection, abatement of nuisances, enforcement of quarantine, and other activities handed down from the early days of public health organization. If this is all a health department is prepared to do, a little desk space is all it needs, and the location of such desk space is not a matter of great importance. On the other hand, if a health department is concerned with the total health problem of the community and is actually doing something about it—if it is operating clinics, maintaining nursing services, giving real protection with regard to water, milk, and food, assisting in civilian defense, and carrying on a health education program which reaches the people—then it has a right to expect consideration from the community. Moreover, it usually gets it.

Usually—but not always. This brings us to the second point—commanding the respect of the public. A health department may actually be making a heroic effort to provide a complete set of modern services. Nevertheless, if it is miserably housed and equipped, if it is relegated to a dark basement or drafty auditorium, then it is

not only hindered in the performance of its work but it fails to get the respect its efforts should command. Unstinting public support is engendered not only by recognition of services performed, but by the manner in which they are performed. Call this salesmanship, or even showmanship, but the truth is that it builds respect and recognition. The end result is that the health department is better able to discharge its obligation to the community.

Financial support for a local health department, however, need not come entirely from local sources. Since 1935, the Federal Government has encouraged the development and maintenance of local health agencies by means of substantial grants-in-aid to the States. Moreover, prior to the present emergency, the construction of health centers was possible through the Work Projects Administration and grants and loans administered by the Public Works Administration. Local health agencies largely neglected to take advantage of this aid, and now the opportunity has been lost. Here again the lack of prestige in the community was undoubtedly reflected. In making applications for grants, the city fathers or county officials were reluctant to consider the plight of that stepchild in the official family, the health department.

In the summer of 1941, Congress appropriated $150,000,000 for defense public works, including health centers. Applications for many more projects than could be undertaken with this sum were quickly submitted, but of the 3,725 applications received prior to January 31, 1942, only 157 were for health centers and clinics. As of February 2, 1942, 52 applications had been approved calling for the construction of centers and clinics involving a total estimated cost of approximately $3,000,000.

In January 1942, an additional sum of $150,000,000 in Federal funds was made available for the provision of community facilities vital to the war effort.

The construction of new buildings, except as defense projects, will undoubtedly be difficult or impossible for some time to come. Materials will be under priority restrictions and labor will be scarce. Nevertheless, a community which wants proper quarters for its health department need not wait until conditions permit the erection of an imposing new building. Quarters far more satisfactory than those now occupied by most health units can be rented, as they are for other municipal and county agencies. Minor repairs can be made when necessary, and decent furniture can be provided. At the very least, soap and water can be applied to remove accumulated grime and filth.

The next great opportunity for the construction of health centers on a large scale may come after the war is over. It is generally be-

lieved that a comprehensive public works program will be necessary in the post-war era to absorb the shock of anticipated unemployment. A "public works reserve" is being developed by the Federal Works Agency and the National Resources Planning Board which are now surveying communities and preparing lists of suitable projects. If local health departments wish to benefit from this contemplated program, they should begin now to consider their needs and problems, and to prepare the ground for suitable action.

Any health center constructed now or in the future should be planned so as to conform to the conception of what a modern health center should be. A well-planned health center requires more than a certain amount of ground space and four walls enclosing floor area partitioned into a number of rooms. If health centers could be planned in this way, it would only be necessary to install a prefabricated house, call the living room the clinic, the dining room the clerical office, and so on. Proper planning, in fact, requires specialized knowledge and consideration of many closely interrelated factors such as function, form, engineering, and local social and economic conditions.

For the best results, the services of specially trained architects should be utilized, at least in a consulting capacity.[2] Nevertheless, it is appropriate to outline here some of the outstanding and less technical points to be considered in judicious planning.

The selection of a suitable site is important. The health center should be situated away from the main business area, but in a place which is fairly accessible. Ground should be allowed for possible future expansion. Adequate vehicular parking space should be available. Preferably, the center should be in a *separate* building; it should not be located in a city hall, courthouse, school building, or welfare center. Those who argue for placing health departments in schools say that such an arrangement is ideal for the promotion of child health. Child health work, however, is only one of the necessary activities of a local health department. It must also carry on venereal disease control, tuberculosis work, and other activities for which a school building is certainly not a desirable location. City halls and courthouses are unsuitable because the work of the health department differs in all essential respects from that of other governmental units. Basic equipment bears no resemblance to that employed by other agencies, nor are techniques at all related. The same considerations rule out the welfare center. Moreover, the relief group constitutes only a small part of the clientele of a health department.

[2] The services of a hospital and health center architectural planning unit are now available to local health agencies upon request to the United States Public Health Service This unit has prepared sketches and floor plans of suggested types of health centers for communities of various sizes The plans are offered as suggestions only, and are not intended to supplant the working drawings of local architects who are familiar with local conditions and needs

All these factors aside, sharing space with other agencies, as we have seen, usually means that the health department will eventually find itself in the basement.

An ideal arrangement is to establish the health center on the grounds of a publicly owned hospital; the next best is to locate it near a nonpublicly owned hospital organized to meet community needs. In this way the health department can utilize the hospital equipment and clinical staff, thus providing better service at lower cost. I would caution against a health center being placed in the hospital building itself unless the structural arrangement is such that it precludes subsequent reassignment of the space for hospital use.

Two main considerations govern the type of architecture. First, the health center should be planned on a functional basis, that is, its form and construction must be rigidly adapted to the uses to which it is to be put. Secondly, the building must be pleasing to the eye. A permanent, fireproof type of construction is preferable to a frame building and not much more expensive. When the expense of the necessary installations such as the water system, heating, lighting, and ventilating equipment—all of which are as necessary in a frame structure as in a fireproof one—is included, the difference in total cost becomes proportionately even less.

The interior of the building should be planned with efficient, coordinated function of all units in mind. Special attention should be given to the "front of the house," the entrance, foyer, reception and waiting room, and other parts of the building where there is contact with the public. All furniture and appointments should be attractive and designed for comfort and use. Adequate provision should be made for consultation rooms, clinics, X-ray and other equipment, laboratory diagnosis, and the maintenance of vital records. There should be an auditorium where lectures, motion pictures, and classes can be held, and space should be allowed for effective display of educational material. Appropriate landscaping and care of the lawn add to the attractiveness of both grounds and building.

An example of a health center in which these features are incorporated is shown in the accompanying illustrations. Figure 1 shows the exterior of a suggested type of health center for a town with 30,000–60,000 population. Figure 2 shows the floor plan of the same center.

A health department housed in such headquarters and properly administered will be a vital force in the community. It will establish itself in the people's hearts and minds as the focal point from which community health activities proceed. Under such circumstances, the health center becomes in fact what in theory it should be, a worthy monument to the science which combats human illness and promotes longer, happier, and more useful living.

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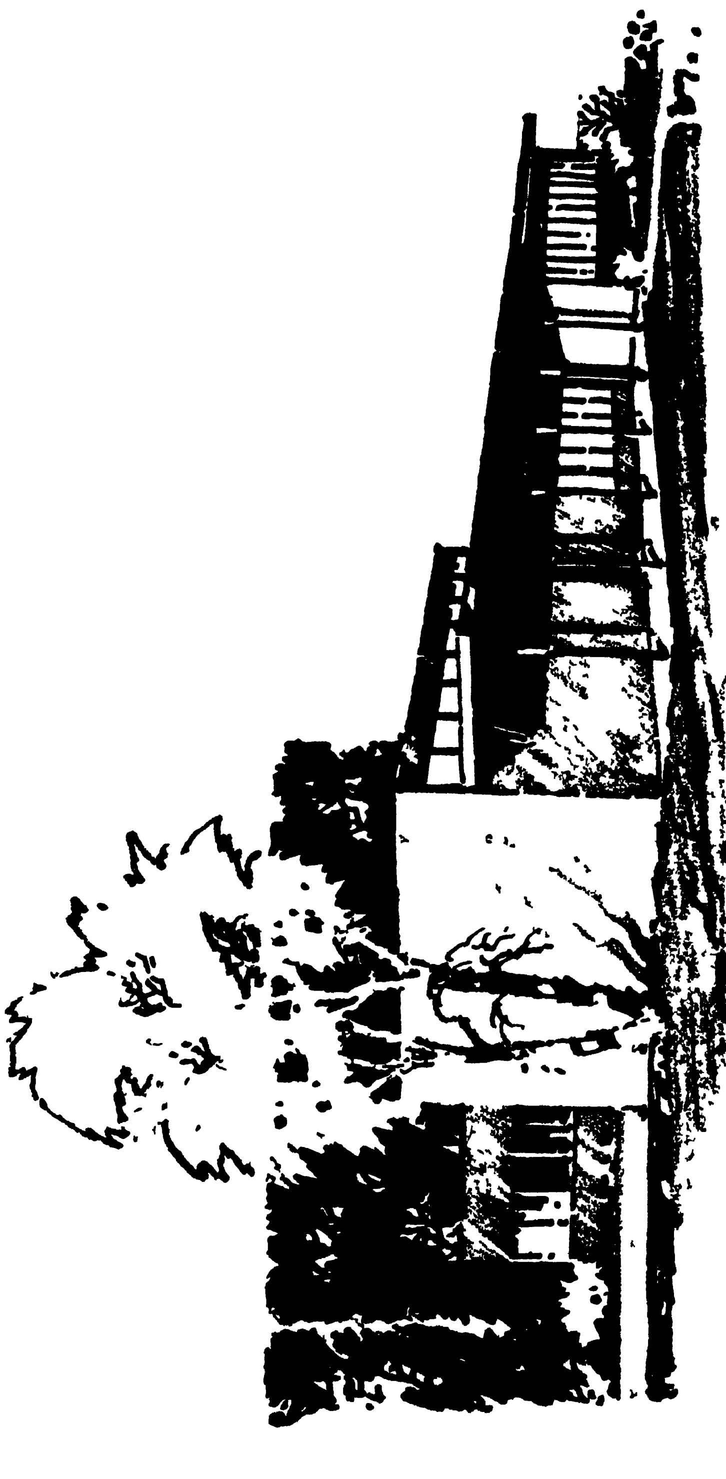

FIGURE 1.—Exterior drawing of a suggested type of health center for a community with 30,000–60,000 population

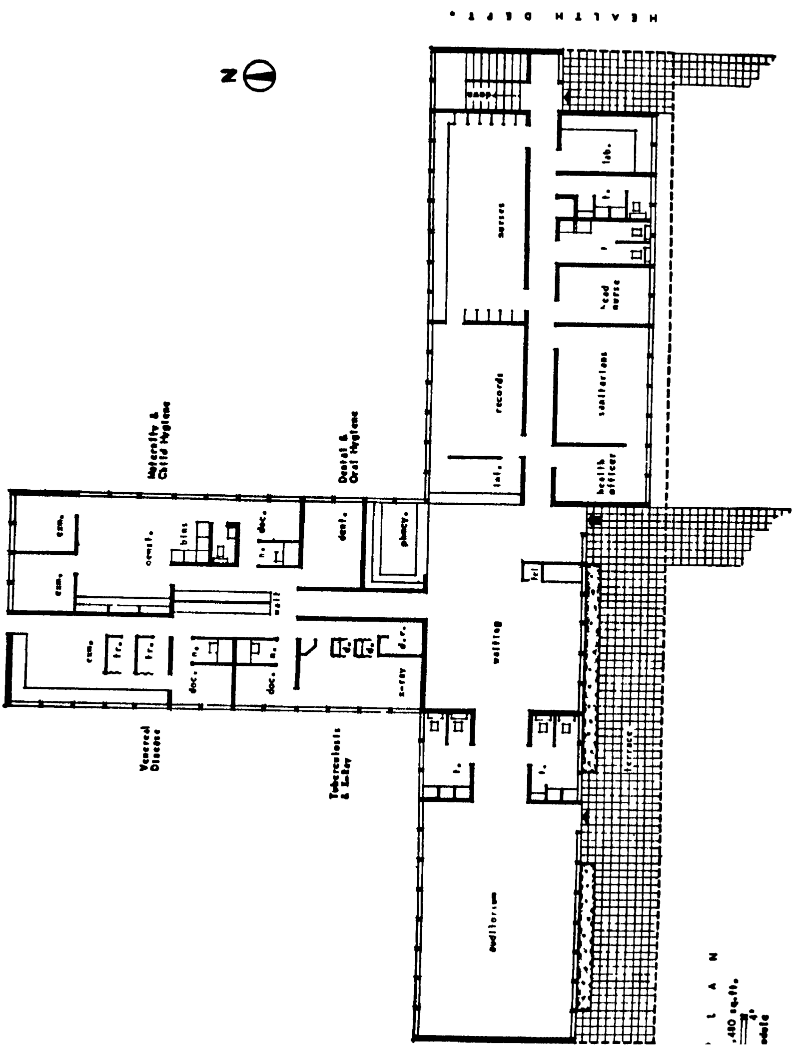

FIGURE 2.—Floor plan of the health center shown in figure 1

THE HISTOPATHOLOGY OF EXPERIMENTAL "Q" FEVER IN MICE [1]

By THEODORE L. PERRIN, *Passed Assistant Surgeon*, and IDA A. BENGTSON, *Senior Bacteriologist, United States Public Health Service*

"Q" fever, a new disease entity, was described by Derrick (*1*) in 1937. Extensive studies on the clinical, epidemiological, bacteriologic, and serologic aspects have been published. However, only two reports dealing with the histopathology of the disease have been published.[2] Burnet and Freeman (*2*) briefly described the histologic appearance of livers and spleens from infected mice, and Lillie, Perrin, and Armstrong (*3*) reported on the histopathology of pneumonitis due to the virus of "Q" fever in man and rhesus monkeys.

Since there is little published data on the microscopic pathology of "Q" fever, a detailed study of the histopathology of experimentally produced "Q" fever in mice is reported here.

MATERIAL AND METHODS

The virus used in this experiment was the "X" strain which was isolated and fully identified in this laboratory (*4*). For the purpose of inoculation, the virus was obtained either from rickettsiae growing on yolk sac membrane, or from the spleens of infected mice; in either case, rickettsiae were demonstrated by smears before preparing the inoculum. The infected yolk sac or spleen was made up into a 10 percent suspension in normal saline.

A total of 91 young Swiss mice were used. Under light ether anesthesia 54 were inoculated intranasally with a suspension of infected yolk sac, while 20 controls were inoculated in the same manner with a 10 percent suspension of normal yolk sac. The remaining 17 were inoculated with a suspension of infected spleen, 12 by the intranasal route, and 5 intraperitoneally. Two-tenths of a cubic centimeter was given to each mouse inoculated intranasally, while 0.5 cc. was used for intraperitoneal injection.

The mice were killed by chloroform inhalation at intervals varying from 1 to 21 days after inoculation. The organs were removed at once and placed in Orth's solution for fixation. Sections for routine study were stained with a modified Romanowsky (*5*) and Van Gieson's stains.

INTRANASAL INOCULATION WITH INFECTED AND NORMAL YOLK SAC

Lungs.—Pneumonia was found in 52 of the 54 mice which were inoculated with infected yolk sac. One day after inoculation the

[1] From the Division of Pathology and the Division of Infectious Diseases, National Institute of Health

[2] Subsequent to the submission of this paper for publication in May 1941, Findlay (*6*) has reported on the pathology of pneumonitis in mice infected intranasally with "Q" fever.

involvement was confined to a few small peribronchial areas. The inflammatory process was exudative at this stage and the cells of the exudate were largely polymorphonuclear neutrophils.

In mice examined 2 and 3 days after inoculation, the pneumonic process was more extensive. The exudative changes were prominent, but proliferative changes were seen and in some animals were equally prominent. Purulent exudate in small amounts was present within most bronchi. In the alveolar exudate, serum was present in some areas, and the cells were about half polymorphonuclear and half mononuclear. The latter were chiefly large and either of the macrophage type or of spindle to polyhedral shape with large leptochromatic nuclei and scanty cytoplasm. The proliferative changes were characterized by adventitial cell proliferation around vessels and bronchi, and by the presence of large, actively multiplying mononuclear cells in alveoli, and on or within thickened interalveolar septa.

In animals killed from the fourth through the eleventh day after inoculation, the pneumonic process was moderately extensive. It was chiefly patchy and peribronchial in distribution, although it was diffuse in some lobes. The proliferative phase nearly always overshadowed the exudative phase, and large mononuclear cells and lymphocytes outnumbered the polymorphonuclears. A little purulent exudate was seen in some bronchi and focally the bronchial epithelial cells were swollen and slightly heaped. Small to moderate numbers of lymphocytes and fewer polymorphonuclears were seen in the connective tissue around bronchi and vessels, and lymphocytes in small numbers were infiltrating interalveolar septa. Nodular accumulations of coherent spindle-shaped mononuclear cells were occasionally seen within alveoli or in septa; the mononuclear cells often tended to be arranged concentrically, and a few polymorphonuclears and lymphocytes were at times intermingled.

In animals killed on the fourteenth and twenty-first days after inoculation, the pneumonic areas were small and the scanty exudate was usually composed of macrophages. Nodular accumulations of spindle-shaped mononuclear cells similar to those described above were present, and generally they were more conspicuous, owing to less prominent pneumonic changes; in each of two nodules seen in one lung, a multinucleate giant cell was observed. Proliferative changes in lung tissue were similar to but less marked than those seen in mice killed before the fourteenth day. Perivascular, peribronchial, and septal lymphocyte infiltration was also less marked, and focal heaping of bronchial epithelium was seldom seen.

Pneumonia was observed in 8 of the 20 control mice. The first observations were made on the fourth day after inoculation, and the pneumonic process was slightly less extensive than that seen in "Q"

infected mice killed on the same day. In the controls it tended to be more exudative and polymorphonuclears usually outnumbered the mononuclear cells in the exudate.

Six and 7 days after inoculation, 3 of 6 controls had no pneumonia, and 1 had only very slight involvement. In the remaining 2, pneumonia was moderately extensive; the proliferative and exudative changes were about equal, as were the cell types in the exudate. Otherwise, the inflammatory process was essentially similar to that described in "Q" infected mice, except that nodular accumulations of concentrically arranged mononuclear cells were not seen.

Only 1 of 10 control mice killed on the fourteenth and eighteenth days had pneumonic lesions.

Spleen.—The most striking changes produced by the inoculation of the virus were found in the spleen. The lesions were nodular or patchy, granulomatous in nature, and nearly always located in the red pulp. They were composed chiefly of large spindle to polyhedral shaped mononuclear cells with oval or elongated leptochromatic nuclei and moderately abundant cytoplasm which was lightly oxyphilic with Romanowsky staining. The cells were at times concentrically arranged. Small to moderate numbers of polymorphonuclears were often found in the lesions, and less often lymphocytes were seen; not infrequently a few degenerating cells with pyknotic and karyorrhectic nuclei were included.

The lesions were first observed on the fourth day after inoculation in 3 of the 6 animals examined. After the fourth day, they were present in all but 2 of the 36 mice studied. The lesions varied in number from spleen to spleen in mice killed on the same day; only an occasional lesion was seen in some spleens, while in others the red pulp was almost completely replaced. There was no definite relation between the time of observation and the number of lesions present after the fourth day; a mouse killed on the fourth day could have as few or as many lesions as one killed on the tenth or twenty-first day.

The lesions varied in size, but the majority were about 100 to 200μ in diameter. There was no clear-cut difference in size between the first lesions seen in mice killed on the fourth day, and in those observed at later intervals. The mononuclear cells were a little larger in the latter, and polymorphonuclears were at times replaced by lymphocytes.

Collagenization was not seen in the nodules at any stage, and in several sections stained for reticulum, reticulum fibers were few or absent.

In the 20 control mice, no lesions similar to those described above were seen.

Other changes were observed in both the infected and the control mice. Follicle hyperplasia was seen more often in control than in

FIGURE 1.—Lung, 6 days. Thickening of interalveolar septa. Serocellular exudate in alveoli. (X150)

FIGURE 2.—Adrenal, 6 days. Granulomatous lesion at corticomedullary junction. Cortex above. (X400)

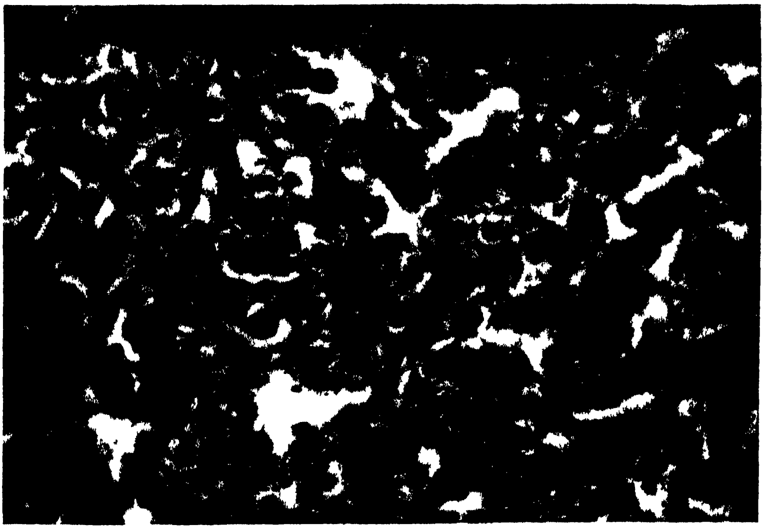

FIGURE 3.—Lung, 9 days. Thickening of interalveolar septa and proliferation of mononuclear cells. (X400)

FIGURE 4.—Spleen 14 days Granulomatous lesion in red pulp (×400)

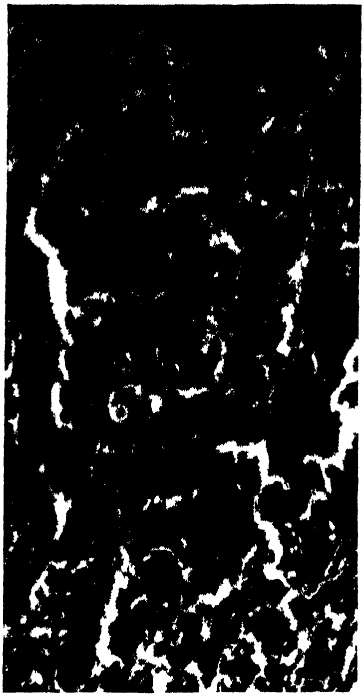

FIGURE 5.—Liver 4 days Granulomatous lesion (×400)

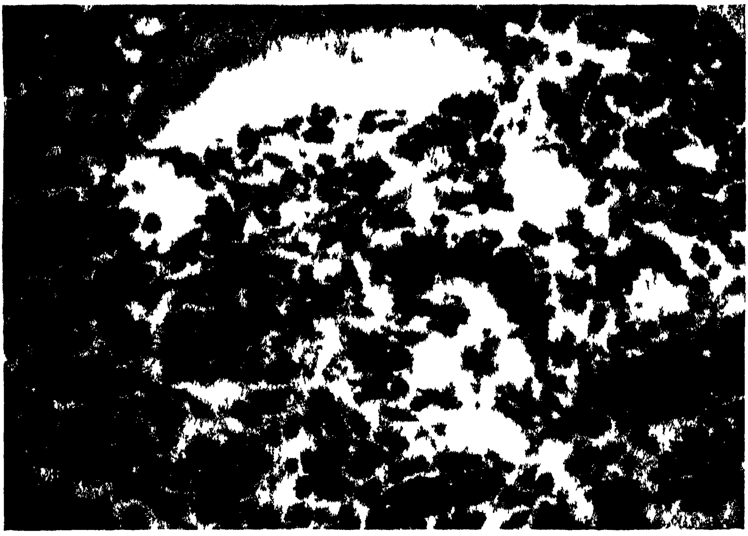

FIGURE 6.—Bone marrow, 9 days Aplastic lesion (×400)

infected mice, while varying degrees of phagocytosis of nuclear fragments by reticulum cells of the follicles was observed with equal frequency in both. Increased numbers of lymphoid and myeloid cells in the red pulp were often seen in control mice and in infected mice which had few nodular lesions; however, when lesions were numerous, lymphoid and myeloid cells were largely replaced by the granulomatous lesions.

Liver.—Examination of the liver in mice inoculated with infected yolk sac revealed nodular granulomatous lesions quite similar to those described in the spleen; they were usually not as numerous and they were not found with such regularity. The changes were first seen on the fourth day, corresponding with the appearance of splenic lesions.

The lesions occurred in various parts of the liver lobules and were approximately of the same size as those seen in the spleen. However, they were often not as compact, and the tendency toward concentric arrangement of the mononuclear cells was not as prominent. A very few shrunken and degenerating liver cells were occasionally seen in or adjacent to lesions, and marginating liver cells usually had a more homogeneous and deeply staining cytoplasm than those seen elsewhere.

The lesions were found in 31 of the 42 infected mice killed on the fourth day or after. When lesions were present, there was no apparent relation between the time of observation and the number or size of the lesions found.

Three of the 20 control mice showed a few nodular lesions similar to those described above.

In a few of the infected mice, there was a slight increase in size of liver cells and a small to moderate number of mitoses were observed. Other changes in the liver were seen with about equal frequency in infected and control mice. These changes included congestion, slight to moderate focal paravascular and portal lymphocyte infiltration, and a slight to moderate increase in the number of lymphoid cells in the sinusoids; the increase in lymphoid cells was at times associated with proliferation of sinusoidal endothelium.

Bone marrow (vertebral).—The bone marrow was negative in infected mice examined prior to the sixth day after inoculation. On and after the sixth day lesions were observed, but they were different in appearance from those seen in the liver and spleen. They appeared as small to moderate sized, nodular or patchy areas of degeneration and aplasia. Occasionally, moderate numbers of adult polymorphonuclears were seen in the early lesions, but for the most part there was almost complete absence of recognizable myeloid cells and only a loose network of stromal cells remained. Usually a small number

of shrunken cells with pyknotic and karyorrhectic nuclei were seen in the fibrillar network connecting the stromal cells.

The lesions first seen on the sixth and seventh days were of smaller size than those observed in mice killed later on. There was slight stromal cell proliferation in the later stages.

The lesions were present in 2 of the 5 infected mice studied on the sixth day, and were found in 15 of the 18 mice in which bone marrow was examined thereafter.

The bone marrow examined in control mice was normal.

Adrenals.—Histopathologic changes were observed in the adrenals in 20 of 32 infected mice killed on and after the sixth day. The pathologic changes were of two types, appearing either as nodular granulomatous lesions similar to those noted in the liver and spleen, or as foci of lymphocyte infiltration. The granulomatous lesions were smaller than those seen in either the liver or spleen and were few in number. The lesions were most often cortical in location, and while they were occasionally seen together in one adrenal, one type was usually present without the other. Granulomatous lesions were present in 8 mice and focal lymphocyte infiltration in 15.

The adrenals examined in control mice were normal.

Kidneys.—Small nodular or patchy areas of interstitial cell proliferation, some of which were granulomatous in appearance, were seen in the kidneys of infected mice killed on and after the sixth day; there was an associated lymphocyte infiltration in some lesions, and at times a few polymorphonuclears and degenerating cells were seen. The lesions were found in 16 of the 35 infected mice examined after the fifth day.

Focal interstitial and perivascular lymphocyte infiltration of slight to moderate degree, not associated with interstitial cell proliferation, occurred with equal frequency in the infected and control mice.

Heart.—Slight to moderate focal lymphocyte infiltration of the myocardium and epicardium was seen in infected and control mice.

Mediastinal and retroperitoneal lymph nodes.—Varying degrees of sinus dilatation, with or without proliferation of sinus endothelium, and slight to moderate phagocytosis of nuclear fragments by reticulum cells of the follicles was observed in approximately the same proportion of control and infected mice.

Thymus.—In a few of the infected and control mice, small cortical cells were reduced in number and partially replaced by large phagocytic mononuclear cells. This process, probably involutional in type, has been observed in mice in other experimentally produced infections (unpublished data). Nelson and Oliphant (*6*) described apparently similar changes in mice experimentally infected with influenza virus.

Stomach, small intestine, and colon.—Foci of lymphocyte and plasma cell infiltration seen in the mucosa or submucosa and less often in the

serosa were not significantly more frequent in the infected than in the control animals.

Testicle.—In most of the infected and control mice, a few small foci of epithelial cell degeneration were seen in seminiferous tubules.

Brain and meninges.—The brain and meninges were examined in 52 infected mice. Lymphocytic meningitis of moderate degree was observed in 2. Three other mice showed a few scattered microglial nodules and small perivascular lymphocyte foci in the thalamus, basal ganglia, and cerebral cortex.

Similar lesions were found in 1 of the 16 control mice in which the brain and meninges were examined.

Other organs.—The thyroid, esophagus, pancreas, spinal cord, and spinal ganglia were examined in a majority of the infected and control mice. No lesions were found.

INTRANASAL INOCULATION WITH A SUSPENSION OF INFECTED SPLEEN

Twelve mice were inoculated intranasally with a suspension of infected spleen. In these mice histopathologic lesions essentially similar to these described in mice inoculated with infected yolk sac were found in the lungs, liver, spleen, bone marrow, adrenals, and kidneys. In addition, a few small nodular or patchy granulomatous areas were seen in the pulp of mediastinal and retroperitoneal lymph nodes. In some of these lesions, nuclear fragments were at times found, and occasionally a multinucleate giant cell was observed.

INTRAPERITONEAL INOCULATION WITH INFECTED SPLEEN

With the exception of the lungs, the 5 mice inoculated intraperitoneally with infected spleen showed similar lesions to those inoculated intranasally with the spleen suspension. The lungs in the mice inoculated intraperitoneally were essentially negative.

DEMONSTRATION OF RICKETTSIAE

The demonstration of the rickettsiae of "Q" fever in smears from infected mouse spleen and liver is usually best accomplished after several passages of infected material, since rickettsiae are often present in increasing numbers in successive transfers.

This experiment was originally planned for the study of histopathologic lesions without regard to the possible demonstration of rickettsiae, and the majority of mice studied represented first passage of the virus from yolk sac. Liver and spleen smears from several of the mice, made at the time of autopsy, showed a very few or no rickettsiae. Correspondingly, in the routine sections stained with Romanowsky stain (*5*), only a very few mice showed an occasional small accumulation of rickettsiae in spleen, liver, and lung.

Since Burnet and Freeman (*2*) described numerous rickettsiae in the liver and spleen in mice experimentally infected with the virus of "Q" fever, it was decided to transfer the virus in small groups of mice until numerous rickettsiae could be demonstrated by smear, and to examine histologic sections from the same tissues for the purpose of observing rickettsiae in stained tissue.

In a group of 4 mice, representing the third passage from yolk sac, numerous rickettsiae were seen in smears from the spleen, and a smaller number in smears from the liver. Histologically, the tissues were similar in appearance to those described above, with numerous granulomatous lesions present in splenic tissue, and a smaller number observed in the liver.

Rickettsiae were found in the sections of both spleen and liver, but they were much more numerous in the former. They usually appeared in sharply circumscribed, round to oval accumulations, both intra and extra-cellular in location. The accumulations varied from about 3μ to 25μ in diameter. The individual organisms within the accumulations were minute coccoid or rod-shaped bodies of rather indistinct outline. They were pale blue in color with Romanowsky stain and were usually set in a very pale blue matrix. The bodies were much paler than mast cell granules or nuclear chromatin and were gram negative. They were not acid fast and did not react as ferric iron with ferrocyanide.

In the spleen, rickettsiae were found only in the red pulp where they were irregularly distributed; they were found both within and apart from the granulomatous lesions. In the spleen the intracellular accumulations were found in large mononuclear cells, and in the liver they were found in the Kupffer cells.

DISCUSSION

The only reference in the literature to the histopathologic findings in mice infected with the virus of "Q" fever is in a report by Burnet and Freeman (*2*). They described only the liver and spleen, and stated that in the latter the only feature calling for comment was the character and distribution of rickettsiae. In the liver they found a diffuse infiltration with cells which appeared to be largely of vascular endothelial origin, variable numbers of small inflammatory necrotic foci, and rickettsiae in interstitial (Kupffer) cells.

In our experiment, striking lesions were present in the liver and spleen, as well as in other organs; the brief description of the liver findings by Burnet and Freeman does not permit an accurate comparison of the changes in this organ. Rickettsiae were demonstrated satisfactorily in tissue sections only after successive transfers of infected material in order to increase the number of rickettsiae.

The "X" strain of the "Q" fever virus used in this experiment has been proved immunologically identical to a strain of Australian "Q" fever virus supplied to this laboratory by Burnet. Lillie (7), working with the "X" strain, the Australian strain referred to above, and a third strain ("M") of "Q" fever virus in guinea pigs, has found lesions which are more widespread than those found in mice in this study. The lesions in guinea pigs included both granulomatous lesions and focal lymphocyte exudation, and in the granulomatous lesions multinucleate giant cells were more frequently encountered than in the mice described in this report.

The pneumonic reaction found in the lungs of mice in this experiment is similar to that described by Lillie, Perrin, and Armstrong (3) in the lungs of monkeys inoculated with the virus of "Q" fever, and, with exceptions, to the pneumonic process in a fatal human case described by the same authors. In the human case fibrin was abundant in the alveolar exudate, while it was not seen in the pneumonia in mice.

SUMMARY

Histopathologic observations have been made on mice killed at intervals from 1 to 21 days after intranasal and intraperitoneal inoculation with a suspension of "Q" fever virus. The virus suspension was prepared from rickettsiae growing on yolk sac and from the spleens of infected mice. In mice inoculated by both routes and using both sources of the virus, nodular and patchy granulomatous lesions composed chiefly of large mononuclear cells were found in the spleen, liver, kidneys, and adrenals. Nodular and patchy areas of aplasia and degeneration were found in the bone marrow. The lesions were first seen on the fourth day in the spleen and liver, and on the sixth day in the kidneys, adrenals, and bone marrow.

A pneumonic reaction characterized by early and prominent proliferative changes, and by the predominance of large and small mononuclear cells in the exudate, was seen only in intranasally inoculated mice.

Granulomatous lesions in mediastinal and retroperitoneal lymph nodes were similar to those seen in the other organs noted above, but they were found only in mice inoculated with a suspension of infected spleen.

Control mice were inoculated intranasally with a suspension of normal yolk sac. Pneumonia was found in 8 of 20 (40 percent), as compared to 52 of 54 (96 percent), infected mice. The pneumonia seen in the control mice tended to be more exudative than proliferative and polymorphonuclears predominated in the exudate.

Nodular granulomatous lesions were seen in the liver in 3 (15 percent) of the control mice, while they were found in 31 of the 42

(74 percent) infected mice killed after the third day. There were no comparable lesions found in the spleen, bone marrow, kidneys, adrenals, and lymph nodes in control mice.

In the infected mice, no significant lesions were found in the heart, thyroid, esophagus, stomach, small intestine, colon, pancreas, testicles, brain, meninges, spinal cord, or spinal ganglia.

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SILICOSIS AMONG METAL MINE WORKERS [1]

A Review

Public Health Bulletin No. 277, which was recently issued, reports the presence of silicosis among a group of metal mine workers in Utah. Previous investigations in this country by the United States Bureau of Mines in cooperation with the United States Public Health Service had indicated the existence of a serious problem of pulmonary disease among metal mine workers near Joplin, Mo. The present study is part of an investigation of the health and working environment of industrial workers in Utah, made with the cooperation of agencies such as the State Industrial Commission, the State Board of Health, industrial organizations, and labor groups.

Sixty-six cases of silicosis were found by medical and X-ray examination of 727 workers whose only experience in dusty trades had been in nonferrous metal mines. Quantitative evaluation of the working environment was made. Correlation of these findings

[1] Health and working environment of nonferrous metal mine workers By W. C. Dreessen, R. T. Page, J. W. Hough, V M. Trasko, J. L Jones, and R W Franks. With a chapter on the physiological response of peritoneal tissue by J. W. Miller Public Health Bulletin No. 277. Government Printing Office, 1942 For sale by the Superintendent of Documents, Washington, D. C. Price 20 cents per copy.

indicated that the incidence of silicosis increased regularly with severity and duration of dust exposure.

When the principal occupational experience of metal mine workers was taken into consideration, it was evident that the incidence of silicosis was concentrated among workers at the face (i. e., drillers, miners, and muckers). Among the group of face workers employed in metal mines for 10 years or more, 29.5 percent were found to have silicosis, while all other workers had an incidence of 7.5 percent.

Lead poisoning ranked next to silicosis in importance as an occupational disease of workers in the mines studied.

On the basis of the data presented, if the atmospheric dust in these and similar metal mining operations is kept below 10 million particles per cubic foot, no disabling silicosis should occur and morbidity from lead may also be expected to decrease.

Nonindustrial diseases such as tuberculosis, syphilis, and heart disease did not differ appreciably in prevalence from that observed in other industrial workers

Recommendations for elimination or control of environmental health hazards were made

DEATHS DURING WEEK ENDED MAY 9, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended May 9, 1942	Corresponding week, 1941
Data from 86 large cities of the United States		
Total deaths	8,184	8,161
Average for 3 prior years	8,385	
Total deaths, first 18 weeks of year	159,961	163,133
Deaths per 1,000 population, first 18 weeks of year, annual rate	12 5	12 8
Deaths under 1 year of age	541	468
Average for 3 prior years	494	
Deaths under 1 year of age, first 18 weeks of year	10,045	9 310
Data from industrial insurance companies		
Policies in force	64,975,585	64 517,124
Number of death claims	11,858	12,394
Death claims per 1,000 policies in force, annual rate	9 5	10 0
Death claims per 1,000 policies, first 18 weeks of year, annual rate	10 1	10 7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED MAY 16, 1942

Summary

The incidence of both measles and meningococcus meningitis for the current week and the cumulative totals to date (first 19 weeks of the year) continue above the 5-year (1937-41) median. The highest incidence rates for measles are in the Pacific, Mountain, and New England States, which areas reported approximately one-half of the total of 22,632 cases for the current week, and the highest incidence of meningococcus meningitis is reported from the New England, Pacific, South Atlantic, and West South Central areas The total number of reported cases of meningococcus meningitis declined from 89 for the preceding week to 86 for the current period The largest numbers of cases were reported in New York State (14), Texas (7), and California (7).

A total of 14 cases of poliomyelitis was reported, as compared with 19 for the preceding week, while smallpox cases increased from 18 to 24, of which 8 cases were reported in Tennessee, 4 in Arkansas, and 3 in Missouri. The current incidence of diphtheria, poliomyelitis, scarlet fever, smallpox, and whooping cough is below that for any corresponding week of record.

The onset of the Rocky Mountain spotted fever season in the East is indicated by the occurrence in the Eastern States of 7 of the 17 cases reported for the week. Montana, Idaho, and Wyoming reported the remaining 10 cases.

Other reports include 19 cases of amebic, 69 cases of bacillary, and 64 cases of unspecified dysentery; 27 cases of tularemia, and 24 cases of endemic typhus fever (of which all but 1 case (in California) occurred in the Southern States).

The death rate for 88 large cities in the United States for the current week is 11.5 per 1,000 population, as compared with 11.6 for the preceding weeks and a 3-year (1939-41) average of 11.9. The cumulative rate to date (first 19 weeks) this year is 12.5, as compared with 12.7 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended May 16, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported cases may have occurred

Division and State	Diphtheria, Week ended May 16 1942	Diphtheria, Week ended May 17 1941	Diphtheria, Median 1937–41	Influenza, Week ended May 16 1942	Influenza, Week ended May 17 1941	Influenza, Median 1937–41	Measles, Week ended May 16, 1942	Measles, Week ended May 17, 1941	Measles, Median 1937–41	Meningitis, meningococcus, Week ended May 16 1942	Meningitis, meningococcus, Week ended May 17 1941	Meningitis, meningococcus, Median 1937–41
NEW ENG												
Maine	0	0	1				127	141	140	3	0	0
New Hampshire	0	0	0			-	38	40	23	1	0	0
Vermont	1	0	0				147	45	45	0	0	0
Massachusetts	7	2	2				1 280	1 053	766	6	0	1
Rhode Island	1	0	0				275	4	74	0	0	0
Connecticut	0	0	3	2		1	407	467	333	0	0	0
MID ATL												
New York	15	16	26	[illegible]	4	7	[illegible]	4 134	2 320	14	5	5
New Jersey	3	5	9	3		[illegible]	[illegible]	2 499	934	4	0	0
Pennsylvania	10	16	16				1 329	5 921	1 530	3	1	4
E NO CEN												
Ohio	10	4	9	5	11	11	497	3 001	1 801	0	1	2
Indiana	1	4	7	1	9	8	219	1 097	609	1	1	0
Illinois	14	8	32	3	13	13	445	1 704	296	0	0	2
Michigan [2]	4		8	0	2	2	570	3 035	802	0	1	1
Wisconsin	0	1	2		15	32	1 401	2 021	1 066	1	3	0
W NO CEN												
Minnesota	4	23	3	0	1	1	862	24	89	0	1	1
Iowa	3	2	2	1	4	3	313	[illegible]	205	0	0	0
Missouri	4	2	5	0	1	2	251	590	39	3	1	1
North Dakota	1	1	1	9		-	17	41	41	0	0	0
South Dakota	4	0	1	0			89	17	1	0	0	0
Nebraska	1	0	4	27			402	21	21	0	0	0
Kansas	4	1	3	4	15	2	[illegible]	771	453	0	0	0
SO ATL												
Delaware	0	0	0	0			8	137	27	0	0	0
Maryland [2]	3	6	6	3	3	4	423	400	241	5	3	2
Dist of Col	0	0	2	0			106	[illegible]	104	4	0	0
Virginia	5	9	9	114	52	52	167	1 149	496	5	2	3
West Virginia	0	7	4	8	4	20	34	619	39	1	1	1
North Carolina	4	9	9	8	6	6	706	1 622	356	2	0	2
South Carolina	2	5	6	161	327	179	100	751	74	1	0	0
Georgia	2	2	5	46	23	23	217	550	109	0	0	0
Florida	6	5	5	1	45	4	219	357	137	0	1	1
E SO CEN												
Kentucky	2	3	4	0		5	68	1 057	286	2	2	2
Tennessee	2	2	4	27	37	45	154	425	134	1	3	3
Alabama	4	1	4	20	49	49	143	400	149	0	1	2
Mississippi [2]	6	3	3						-	1	4	1
W SO CEN												
Arkansas	[3] 4	3	5	[3] 20	8	34	193	371	55	2	0	0
Louisiana	7	2	8	2	4	7	223	52	14	4	0	1
Oklahoma	2	1	2	19	22	25	153	74	74	0	0	0
Texas	24	18	27	301	442	230	991	1 146	758	7	0	3
MOUNTAIN												
Montana	2	0	0	0	1	1	207	36	42	0	0	0
Idaho	1	0	0	1		1	156	12	22	0	0	0
Wyoming	0	0	0	64	1		[illegible]	30	28	0	0	0
Colorado	7	7	7	35	14	4	260	641	299	2	0	0
New Mexico	6	1	1	3		2	27	212	72	0	0	0
Arizona	2	2	2	71	65	52	144	125	66	2	0	0
Utah [2]	0	1	0	3	12	-	1 269	63	86	0	0	0
Nevada		0	-		-	----	4	0	-	0	0	----
PACIFIC												
Washington	1	1	1		--		547	21	62	4	0	0
Oregon	0	2	4	12	8	18	185	197	67	0	0	0
California	6	13	16	24	72	53	4,988	450	450	7	1	2
Total	185	193	288	1,008	1 275	1,014	22 632	37 979	15,800	86	32	48
19 weeks	[3] 5,256	5 145	8 468	[3] 73,372	477 010	153 546	351 766	654 845	258 610	1 486	942	942

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended May 16, 1942, and comparison with corresponding week of 1941 and 5-year median—Con

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Me dian 1937-41	Week ended		Me dian 1937-41	Week ended		Me dian 1937-41	Week ended		Me dian 1937-41
	May 16, 1942	May 17, 1941		May 16, 1942	May 17, 1941		May 16, 1942	May 17, 1941		May 16, 1942	May 17, 1941	
NEW ENG												
Maine	0	0	0	4	12	11	0	0	0	1	0	0
New Hampshire	0	0	0	7	1	5	1	0	0	0	0	0
Vermont	0	0	0	12	9	9	0	0	0	1	0	0
Massachusetts	0	0	0	284	214	214	0	0	0	1	11	2
Rhode Island	0	0	0	14	20	13	0	0	0	0	0	0
Connecticut	0	0	0	20	41	107	0	0	0	2	0	1
MID ATL												
New York	3	0	0	366	488	727	0	0	0	4	9	8
New Jersey	0	1	0	158	274	261	0	0	0	1	2	2
Pennsylvania	0	1	1	406	388	388	0	0	0	9	5	5
E NO CEN												
Ohio	0	0	0	269	228	351	0	0	0	4	4	4
Indiana	0	0	0	56	82	85	0	1	21	1	0	2
Illinois	0	1	1	128	298	420	0	6	11	2	4	4
Michigan [1]	0	0	0	188	255	385	0	0	1	0	5	2
Wisconsin	1	0	0	112	127	131	0	2	2	2	0	0
W NO CEN												
Minnesota	0	0	0	45	55	70	1	0	4	0	1	1
Iowa	0	0	0	23	29	75	1	8	20	2	1	1
Missouri	0	0	0	58	160	64	3	3	3	2	0	2
North Dakota	0	0	0	5	2	12	0	0	1	0	0	0
South Dakota	0	1	0	12	14	16	0	21	5	0	0	0
Nebraska	0	0	0	26	8	23	0	1	5	0	0	0
Kansas	[2] 0	0	0	50	19	54	0	1	4	2	1	1
SO ATL												
Delaware	0	0	0	30	12	4	0	0	0	0	0	0
Maryland [2]	1	0	0	54	33	33	0	0	0	2	4	2
Dist of Col	0	0	0	6	11	12	0	0	0	0	1	0
Virginia	0	1	0	15	19	19	0	0	0	1	4	4
West Virginia	0	0	0	26	38	38	0	0	0	1	2	3
North Carolina	1	0	1	16	16	22	1	1	0	3	2	2
South Carolina	1	0	0	3	12	2	0	0	0	2	1	1
Georgia	0	0	0	10	16	9	0	4	1	10	6	5
Florida	2	1	1	4	2	6	0	0	0	7	4	4
E SO CEN												
Kentucky	1	0	0	44	115	48	0	9	3	5	6	5
Tennessee	0	0	0	25	43	43	8	0	1	2	5	5
Alabama	2	1	1	8	13	7	1	0	0	0	1	5
Mississippi [2]	0	1	1	0	0	5	1	0	0	4	0	2
W SO CEN												
Arkansas	1	1	0	6	3	6	4	1	1	2	1	2
Louisiana	0	1	0	12	3	10	0	0	0	11	6	9
Oklahoma	0	1	0	2	14	18	2	0	1	2	3	3
Texas	0	1	1	48	33	37	1	1	5	7	3	7
MOUNTAIN												
Montana	0	0	0	16	15	17	0	0	2	0	0	1
Idaho	0	0	0	7	1	9	0	0	0	0	0	0
Wyoming	1	0	0	19	9	5	0	0	0	0	0	0
Colorado	0	0	0	22	23	38	0	2	5	8	1	2
New Mexico	0	0	0	0	0	13	0	0	0	0	3	1
Arizona	0	3	0	4	3	7	0	0	0	0	1	1
Utah [2]	0	0	0	20	9	20	0	0	0	0	0	0
Nevada	0	0		0	0		0	0		0	0	
PACIFIC												
Washington	0	1	1	18	24	25	0	1	1	2	0	1
Oregon	0	0	1	13	7	18	0	1	19	0	0	1
California	0	2	3	71	105	147	0	0	6	4	1	8
Total	14	18	19	2 742	3 303	4 284	24	63	250	102	98	129
19 weeks	[2] 391	417	395	72 081	70 865	94 223	419	882	5 987	1 507	1 506	2,119

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended May 16, 1942—Continued

Division and State	Whooping cough, Week ended May 16, 1942	Whooping cough, Week ended May 17, 1941	Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
			Week ended May 16, 1942								
NEW ENG.											
Maine	26	36	0	0	0	0	0	0	0	0	0
New Hampshire	2	13	0	0	0	0	0	0	1	0	0
Vermont	31	28	0	0	0	0	0	0	0	0	0
Massachusetts	239	257	0	0	0	0	1	0	0	0	0
Rhode Island	36	29	0	0	0	0	0	0	0	0	0
Connecticut	100	93	0	1	0	0	0	0	0	0	0
MID. ATL.											
New York	437	257	0	5	2	0	2	0	1	0	0
New Jersey	313	134	0	0	0	0	2	0	0	0	0
Pennsylvania	219	392	0	0	0	0	0	0	0	0	0
E. NO. CEN.											
Ohio	189	452	0	0	0	1	2	0	0	0	0
Indiana	58	35	0	0	0	0	0	0	0	0	0
Illinois	243	108	0	1	1	0	2	0	0	2	0
Michigan [3]	187	389	0	2	0	0	0	0	0	0	0
Wisconsin	246	125	0	0	0	0	1	0	0	0	0
W. NO. CEN.											
Minnesota	48	101	0	0	0	0	0	0	0	0	0
Iowa	18	50	0	0	0	0	0	0	0	2	0
Missouri	7	78	0	0	0	0	0	0	0	1	0
North Dakota	7	29	0	0	0	0	1	0	2	0	0
South Dakota	5	19	0	0	0	0	0	0	0	0	0
Nebraska	1	18	0	0	0	0	0	0	0	0	0
Kansas	42	169	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	0	5	0	0	0	0	0	0	0	0	0
Maryland [2]	39	77	0	0	0	0	0	0	2	0	0
Dist. of Col.	19	23	0	0	0	0	0	0	0	0	0
Virginia	55	140	0	0	0	27	0	0	0	3	0
West Virginia	1	89	0	0	0	0	0	0	1	0	0
North Carolina	100	276	0	0	0	0	0	0	0	0	1
South Carolina	56	163	0	0	0	0	0	0	0	1	3
Georgia	62	58	0	0	1	0	0	0	0	1	7
Florida	12	21	0	1	0	0	0	0	0	0	1
E. SO. CEN.											
Kentucky	63	67	0	0	0	0	0	0	0	0	0
Tennessee	41	99	0	1	0	0	0	0	0	2	3
Alabama	83	51	0	0	0	0	0	0	0	0	2
Mississippi [2]	-----	------	0	0	0	0	0	0	0	1	0
WEST SOUTH CENTRAL											
Arkansas	9	50	0	0	1	0	0	0	0	3	0
Louisiana	8	14	0	3	0	0	0	0	0	2	2
Oklahoma	8	26	0	0	0	0	0	0	0	0	0
Texas	136	309	0	2	63	0	0	0	0	0	4
MOUNTAIN											
Montana	14	24	0	0	0	0	0	0	7	6	0
Idaho	10	22	0	0	0	0	0	0	1	0	0
Wyoming	8	6	0	0	0	0	1	0	2	0	0
Colorado	27	249	0	0	0	0	0	0	0	0	0
New Mexico	14	27	0	1	0	0	0	0	0	0	0
Arizona	36	43	0	0	0	36	0	0	0	0	0
Utah [2]	32	100	0	0	0	0	0	0	0	2	0
Nevada	10	1	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	75	177	0	0	0	0	0	0	0	0	0
Oregon	21	42	0	0	0	0	0	0	0	0	0
California	265	774	0	2	1	0	1	0	0	1	1
Total	3,658	5,745	0	19	69	64	13	0	17	27	24
19 weeks	73,019	87,979									

[1] New York City only. [2] Period ended earlier than Saturday.
[3] Correction.—Week ended May 9, 1942. Arkansas, diphtheria, 7 cases, influenza, 47; Kansas, poliomyelitis, 1 case.

WEEKLY REPORTS FROM CITIES

City reports for week ended May 2, 1942

This table lists the reports from 89 cities of more than 10 000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis infectious, cases	Influenza		Measles cases	Meningitis meningococcus cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	6	1	4	0	2	0	6	0	2	3
Baltimore, Md	0	0	1	0	309	4	14	0	37	0	0	33
Barre, Vt	0	0		0	0	0	0	0	0	0	0	3
Billings, Mont	0	0		0	9	0	0	0	0	0	0	0
Birmingham, Ala	0	0	3	0	5	0	6	0	4	1	0	2
Boise, Idaho	0	0		0		0	0	0		0	0	0
Boston, Mass	0	0		0	401	0	14	0	110	0	0	44
Bridgeport, Conn	0	0		0	11	1	0	0	5	0	0	0
Brunswick, Ga	0	0		0	9	0	0	0	0	0	0	0
Buffalo, N Y	0	0		1	14	0	4	0	12	0	0	7
Camden, N J	0	0		0	3	0	1	0	17	0	0	0
Charleston, S C	0	0	4	0	6	0	2	0	0	0	1	7
Charleston, W Va	0	0		0	0	0	0	0	0	0	0	0
Chicago, Ill	14	0		1	93	0	25	0	70	0	0	98
Cincinnati, Ohio	0	0		0	0	0	3	0	25	0	0	21
Cleveland, Ohio	0	0	2	1	9	1	3	0	76	0	0	39
Columbus, Ohio	3	0	1	1	32	0	5	0	6	0	0	13
Concord, N H	0	0		1	0	0	1	0	0	0	0	0
Cumberland Md	0	0		0	2	0	0	0	2	0	0	0
Dallas, Tex	0	0		0	100	0	2	0	3	0	1	5
Denver, Colo	4	0	10	0	153	0	5	0	6	0	0	6
Detroit, Mich	0	0		2	16	1	11	0	119	0	1	85
Duluth, Minn	0	0		0	3	0	2	0	7	0	0	0
Fall River, Mass	0	0		0	61	0	1	0	28	0	0	0
Fargo, N Dak	0	0		0	0	0	0	0	0	0	0	0
Flint, Mich	0	0		0	4	0	1	0	1	0	0	9
Fort Wayne, Ind	0	0		0	0	0	5	0	0	0	0	1
Frederick, Md	0	0		0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0		0	7	0	0	0	2	0	0	0
Grand Rapids, Mich	0	0		1	5	0	0	0	2	0	0	3
Great Falls Mont	0	0		0	44	0	0	0	1	0	0	5
Hartford Conn	0	0		0	33	0	1	0	4	0	0	11
Helena, Mont	0	0		0	0	0	0	0	0	0	0	1
Houston, Tex	0	0		0	69	0	6	0	2	0	0	1
Indianapolis, Ind	0	0		1	75	0	7	0	34	0	0	40
Kansas City Mo	1	0		0	150	0	5	0	42	0	0	3
Kenosha, Wis	0	0		0	14	0	0	0	1	0	0	18
Little Rock Ark	0	0		0	7	2	3	0	0	0	0	0
Los Angeles Calif	2	0	11	1	725	0	18	1	13	0	0	25
Lynchburg, Va	0	0		0	0	0	2	0	0	0	0	30
Memphis, Tenn	0	0	3	1	32	0	2	0	3	2	0	12
Milwaukee Wis	0	0	2	2	133	1	7	0	28	0	0	50
Minneapolis, Minn	0	0		0	477	0	3	0	11	0	1	3
Missoula, Mont	0	0		0	0	0	0	0	3	0	0	0
Mobile, Ala	1	0	1	1	0	0	1	1	0	0	0	0
Nashville, Tenn	0	0		0		0	0	0	1	0	0	11
Newark, N J	0	1	1	0	330	0	3	0	17	0	0	38
New Haven Conn	0	0		1	170	0	1	0	3	0	0	7
New Orleans La	0	0	1	0	76	1	8	0	3	0	1	5
New York N Y	18	0	7	1	93	14	52	0	283	0	5	284
Omaha, Nebr	0	0		0	222	0	1	0	5	0	0	1
Philadelphia, Pa	1	1	2	2	56	1	24	0	246	0	0	103
Pittsburgh, Pa	1	0		0	10	0	9	0	22	0	2	32
Portland, Maine	0	0		0	6	4	1	0	0	0	0	0
Providence, R I	1	0		0	208	1	2	0	10	0	0	31

City reports for week ended May 2 1942—Continued

	Diphtheria cases	Encephalitis infectious cases	Influenza		Measles cases	Meningitis meningococcus cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Pueblo Colo	0	0		0	5	0	1	0	0	0	0	2
Racine Wis	0	0		0	422	0	1	0	2	0	0	38
Reading Pa	0	0		0	10	0	0	0	1	0	0	6
Richmond Va	0	1	1	0	6	0	1	0	0	0	0	1
Roanoke Va	0	0		0	0	0	0	0	0	0	0	0
Rochester N Y	0	0		0	7	0	1	0	0	0	0	77
Sacramento Calif	0	0		0	97	1	7	0	0	0	1	31
Saint Joseph Mo	0	0		0	2	0	0	0	1	0	0	0
Saint Louis Mo	0	0	3	1	150	1	16	0	27	0	0	4
Saint Paul Minn	0	0		0	206	0	5	0	7	0	0	20
Salt Lake City Utah	0	0		0	99	0	2	0	4	0	0	7
San Antonio Tex	0	0	1	0	30	0	12	0	0	0	0	1
San Francisco Calif	0	1	3	0	375	1	11	0	7	0	1	14
Savannah Ga	0	0	1	1	1	0	2	0	0	0	0	
Seattle Wash	0	0		1	72	1	3	0	1	0	0	24
Shreveport La	0	0		0	3	0	2	0	0	0	0	0
South Bend Ind	0	0		0	2	0	0	0	8	0	0	0
Spokane Wash	0	0		0	45	0	2	0	5	0	0	7
Springfield Ill	0	0		0	50	0	0	0	4	0	0	0
Springfield Mass	0	0	1	0	93	0	4	0	14	0	0	6
Superior Wis	0	0		0	1	0	0	0	4	0	0	1
Syracuse N Y	0	0		0	209	0	2	0	1	0	0	49
Tacoma Wash	0	0		0	8	0	0	0	1	0	0	1
Tampa Fla	0	0	2	2	139	0	3	0	0	0	1	2
Terre Haute Ind	0	0		0	7	0	2	0	0	0	0	0
Topeka Kans	0	0		0	40	0	4	0	1	0	0	4
Trenton N J	0	0		0	4	0	6	0	10	0	0	9
Washington D C	0	0		0	84	4	10	0	13	0	1	27
Wheeling W Va	0	0		0	4	0	1	0	2	0	0	2
Wichita Kans	0	0		0	108	0	2	0	1	0	0	4
Wilmington Del	0	0		0	9	0	4	0	3	0	0	0
Wilmington N C	0	0		0	7	0	1	0	0	0	0	3
Winston Salem N C	0	0		0	37	0	2	0	2	0	0	0
Worcester Mass	0	0		0	5	1	10	0	9	0	0	62

Dysentery amebic—Cases Dallas 1 New York 2
Dysentery bacillary Cases Chicago 4 Los Angeles 1 Rochester N Y 7 New York 3
Typhus fever—Cases New York 2 Tampa 1

Rates (annual basis) per 100,000 population for the group of 89 selected cities in the preceding table (estimated population, 1942, 34, 042 779)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended May 2 1942	7 05	10 26	3 68	946 06	58 20	214 13	0 46	2 76	219 80
Average for week 1937 41	14 84	20 56	6 31	[1] 706 50	78 38	283 07	2 47	3 09	192 32

[1] Median

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent)—According to information dated April 20, 1942, a rat found near Makawao Post Office 9 6 miles from the port of Kahului Island of Maui, T H , has been proved positive for plague

FOREIGN REPORTS

BERMUDA

Communicable diseases—1941.—During the year 1941, cases of certain communicable diseases were reported in Bermuda as follows:

Disease	Cases	Disease	Cases
Chickenpox	136	Ophthalmia neonatorum	2
Dengue	1,401	Scarlet fever	8
Diphtheria	19	Tetanus	4
German measles	9	Tuberculosis (all forms)	13
Influenza	182	Typhoid and paratyphoid fever	20
Measles	326	Undulant fever	15
Mumps	15	Whooping cough	2

Vital statistics—1941.—Following are vital statistics for Bermuda for the year 1941:

	Number	Rate per 1,000 population		Number	Rate per 1,000 population
Marriages	295		Deaths from—continued		
Live births	734	23 5	Heart disease	89	
Deaths, all causes	400	12 33	Nephritis	36	
Deaths under 1 year of age	32	[1] 43 59	Pneumonia	22	
Deaths from—			Puerperal septicemia	1	
Appendicitis	4		Senility	7	
Cancer	39		Suicide	1	
Cerebral hemorrhage, embolism, and thrombosis	57		Syphilis	2	
Diabetes mellitus	9		Tetanus	3	
Diphtheria	2		Tuberculosis (all forms)	12	
Enteritis (under 2 years of age)	1		Typhoid fever	2	

[1] Per 1,000 live births

NOTE.—The estimated civil population for 1941 is 32,451.

CANADA

Provinces—Communicable diseases—Week ended April 18, 1942—During the week ended April 18, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta [1]	British Columbia	Total
Cerebrospinal meningitis		3	1	1	10		1		5	21
Chickenpox		14		203	296	28	38		151	730
Diphtheria	2	12	5	7	7	5	1		1	40
Dysentery				6						6
German measles			7	26	60	8	23		59	183
Influenza		24				3			48	75
Measles			7	431	229	236	6		20	929
Mumps		7	1	326	545	129	247		494	1 749
Pneumonia		11			17	2	1		15	46
Poliomyelitis			2			1				3
Scarlet fever	5	20	17	81	234	39	26		25	447
Tuberculosis	1	1	5	87	38	[2] 47	24		23	226
Typhoid and paratyphoid fever				13	2		6		1	22
Undulant fever				1						1
Whooping cough		24	4	114	64	6	2		43	257
Other communicable diseases	1	5		7	251	33	2		1	300

[1] No reports were received from Alberta for this period
[2] For the 4 week period ended Apr 22 1942

EGYPT

Notifiable diseases—First 3 quarters of 1941—During the first 3 quarters of the year 1941, certain notifiable diseases were reported in Egypt as follows

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal fever	142	82	Pneumonia	4 562	3 94
Chickenpox	1 773	15	Poliomyelitis	14	[illegible]
Diphtheria	2 839	1 354	Puerperal septicemia	375	28
Dysentery	2 425	360	Tetanus	333	24
Influenza	9 153	141	Tuberculosis (all forms)	4 926	2 59
Leprosy	397	57	Typhoid fever	4 507	92
Malaria	6 789	61	Typhus fever	8 684	1,60
Measles	8 854	2 579	Whooping cough	2 596	15
Plague	14	6			

SWEDEN

Notifiable diseases—February 1942—During the month of February 1942, cases of certain notifiable diseases were reported in Sweden as follows

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	3	Poliomyelitis	13
Diphtheria	77	Scarlet fever	1,499
Dysentery	48	Syphilis	25
Epidemic encephalitis	1	Undulant fever	5
Gonorrhea	777	Weil's disease	1
Paratyphoid fever	6		

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year All reports of yellow fever are published currently

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month

Plague

Indochina—Laos—During the period April 21–30, 1942, 3 deaths from plague were reported in Laos, Indochina.

Peru.—During the month of March 1942, plague was reported in Peru, by Departments, as follows: Lambayeque, 1 case; Libertad, 3 cases; Lima, 8 cases, 4 deaths; Piura, 3 cases, 1 death.

Typhus Fever

France—Vichy—During the week ended May 2, 1942, 1 case (imported) of typhus fever was reported in Vichy, France

Hungary—During the week ended April 25, 1942, 11 cases of typhus fever were reported in Hungary

Morocco—During the week ended April 25, 1942, 1,386 cases of typhus fever were reported in Morocco

Rumania—During the week ended May 2, 1942, 140 cases of typhus fever were reported in Rumania

Tunisia.—During the week ended April 18, 1942, 676 cases (71 in Tunis and 14 in Sousse) of typhus fever were reported in Tunisia. For the week ended April 11, 1942, 583 cases (51 in Tunis and 7 in Sfax) were reported.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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PREVALENCE OF DISEASE

Public Health Reports

Vol. 57 • MAY 29, 1942 • *No. 22*

THE HISTOPATHOLOGY OF TYPE B (LEE STRAIN) INFLUENZA IN MICE[1]

By J. W. OLIPHANT, *Passed Assistant Surgeon,* and T. L. PERRIN, *Passed Assistant Surgeon, United States Public Health Service*

The Lee strain of human influenza virus was isolated in 1940 by Francis (*1*) by inoculation of ferrets with throat washings. The disease in ferrets was found to differ from that usually produced by type A virus strains. The virus was adapted to mice and produced a pneumonia similar to that of type A influenza. No antigenic relation was found between the two types by the usual tests of cross immunity, serum protection, and complement fixation. The infective titer of the lung was also much lower in type B mouse influenza than that of most type A strains. A sample of the type B mouse adapted virus was kindly supplied by Dr. Francis and his report of strain differences was confirmed. A study of the histopathology of the experimental infection in mice was done to determine whether any further differences might be demonstrated.

Method.—Four groups of young white Swiss mice weighing 13 to 16 gm., all of the same strain from a single breeder, were inoculated intranasally on the same day with .05 cc. of one of the following preparations:

1. Type B virus: 1:5,000 suspension of mouse lungs from mice inoculated 2 days previously with 1:10 suspension of B virus infected lung. The lungs showed gross areas of pneumonia. They were ground in a mortar with quartz sand and 50 percent beef infusion broth-saline buffered to pH 7.6, lightly centrifuged, and the supernatant diluted further with broth-saline.

2. Normal mouse lung: 1:5,000 suspension prepared as for group 1.

3. B virus plus PR8 (2) immune rabbit serum: Prepared by adding equal quantities of 1:2,500 lung suspension described in group 1, and 1:2 serum-saline. Final dilution of lung 1:5,000, of serum 1:4. The mixture was allowed to stand for 1 hour at room temperature before use.

[1] From the Division of Infectious Diseases and the Division of Pathology, National Institute of Health.

4. B virus plus B immune rabbit serum: Prepared as described in group 3.

A total of 71 inoculated mice was studied. They were killed, usually four from each group, at intervals from 1 to 25 days after inoculation. Tissues were removed immediately and fixed in Orth's solution. Sections were routinely stained with modified Romanowsky (*3*) and Van Gieson stains.

HISTOPATHOLOGIC FINDINGS

LUNGS

Inoculation with B virus.—One day after inoculation the lungs were negative in three of four mice examined; in the fourth, small patchy peribronchial pneumonic lesions were observed. In the pneumonic areas the bronchi contained a few polymorphonuclear neutrophils, the bronchial epithelial cells were slightly swollen in a few foci, and small numbers of lymphocytes and polymorphonuclears were seen in slightly widened perivascular spaces. The alveolar exudate was scanty and composed of equal numbers of polymorphonuclear and mononuclear cells. About half of the latter were lymphocytes, while the remainder were moderate to large in size and round or polyhedral with fairly abundant amphophilic cytoplasm; nuclei were round or oval and lepto- or trachychromatic.

Two days after inoculation scattered small pneumonic areas similar to those described above were seen in three mice; in the fourth, a few bronchi contained polymorphonuclears and bronchial epithelial cells were slightly swollen focally, but no lesions were seen in the parenchyma.

In mice killed 3 days after inoculation, peribronchial pneumonic lesions were seen in all. The inflammatory process was slightly more extensive than in mice killed prior to the third day, and while the alveolar exudate was still scanty and the cellular components remained the same, a little serum was now present in some foci. In addition, slight thickening of interalveolar septa was observed in pneumonic areas, with small to moderate numbers of lymphocytes and large mononuclear cells and fewer polymorphonuclears found in or on the septa. A small amount of purulent exudate was present in many bronchi, both within and apart from the pneumonic areas. Polymorphonuclears were at times adherent to the surface of the bronchial epithelium, and degenerative changes were noted focally in the latter. These degenerative changes varied in extent and degree; focally there was only slight swelling of the epithelial cells, while in other areas swollen cells were heaped with loss of polarity, and a small number exhibited cytoplasmic oxyphilia and vacuolization and pyknosis or karyorrhexis. A few infiltrating polymorphonuclears were

seen in the epithelium, and occasional epithelial cells contained single small spherical oxyphilic hyaline bodies in the cytoplasm. Slight to moderate peribronchial and perivascular infiltration by lymphocytes and polymorphonuclears was noted in the involved portions of the lungs, and a little serum was occasionally seen in widened perivascular spaces.

Five and seven days after inoculation the pneumonic process was more extensive than that described on the third day; approximately one-fourth to one-half of the sectioned lung tissue was involved. Lymphocytes and large mononuclear cells outnumbered polymorphonuclears in the scanty alveolar exudate. In the bronchi degenerative changes in the epithelium were more prominent, with complete desquamation of lining cells seen in patchy areas. In addition, evidence of proliferation was seen in the heaping of swollen, deeply stained epithelial cells in which occasional mitoses were observed.

By the ninth day after inoculation, macrophages were intermingled with degenerating epithelial cells and polymorphonuclears in the bronchial exudate, and while degenerative changes were still noted in the lining epithelium, proliferative changes were more prominent and a tendency toward squamous metaplasia was noted focally in the heaped-up cells. Occasionally a single layer of flattened cells was observed covering areas in which desquamation appeared to have taken place. There were slight to moderate perivascular and peribronchial infiltration, chiefly by lymphocytes, and slight proliferation of adventitial cells. Mononuclear cells definitely predominated over the polymorphonuclears in the scanty alveolar exudate, and among the mononuclear cells large foamy macrophages and spindle shaped cells of the fibroblast type were not uncommon. In some areas a thick layer of hyaline oxyphil material lined the walls of bronchioles, alveolar ducts, and groups of adjacent alveoli. Small to moderate numbers of lymphocytes and large mononuclear cells were seen in or on the thickened interalveolar septa in pneumonic areas. Focally the pleural mesothelial cells were swollen and heaped, and a small number of lymphocytes were seen among them.

Fifteen days after inoculation there was a striking difference in the bronchial and lung lesions as compared to the findings seen on the ninth day. Degenerative changes were no longer seen in the bronchial epithelium, and the lining cells were either normal or slightly to moderately heaped; in a very few bronchi occasional small groups of sub-epithelial lymphocytes were seen. Peribronchial and perivascular lymphocyte infiltration was moderate to marked. Patchy peribronchial areas showed slight septal thickening in some areas due to lymphocyte infiltration and the presence of elongated mononuclear cells on or within the septa; intra-alveolar macrophages were sometimes present in these areas. In other areas the lung tissues

appeared solid or nearly so, with occasional small spaces containing intact and fragmenting polymorphonuclears, lymphocytes, and macrophages. The solid appearance was due to marked septal thickening and the presence of numerous epithelial cells of the squamous type which completely filled or thickly lined the alveoli. In the thick interalveolar septa proliferating spindle and polyhedral shaped large mononuclear cells were intermingled with moderate numbers of infiltrating lymphocytes.

Twenty-five days after inoculation the type of inflammatory reaction was similar to that observed after 15 days, but the areas of involvement were fewer and smaller.

Inoculation with B virus combined with A serum.—The histopathologic findings in the lungs of mice killed at intervals after inoculation with B virus combined with A serum were indistinguishable from those observed in mice inoculated with B virus alone.

Inoculation with B virus combined with B serum, and with a suspension of normal lung in saline.—Lung lesions were seen in 7 of 29 mice which were inoculated with B virus combined with B serum, or with a suspension of normal lung in saline. However, the lesions were variable and they differed from those produced by the virus alone. Of the 7 mice, there were scattered small bronchopneumonic lesions in 3, a few small peribronchial areas of interalveolar septal thickening in 2, moderate focal parenchymal lymphocyte infiltration in 1, and diffuse consolidation of an entire lobe in 1.

TRACHEA

Tracheitis was observed in mice inoculated with B virus alone, or with B virus combined with A serum, but was not seen in mice inoculated with B virus combined with B serum, or with a suspension of normal lung in saline. The inflammatory process was similar in type to that described in the bronchi, but it was not as marked.

MEDIASTINAL LYMPH NODES

In mice killed 5 days after inoculation or later, the lymph nodes seen in sections from those inoculated with B virus alone or B virus combined with A serum were usually two to three times as large as the lymph nodes seen in mice inoculated with B virus combined with B serum, or a suspension of normal lung in saline. The enlargement was due to a diffuse increase in small and medium sized lymphocytes, and the enlarged nodes showed moderate to marked phagocytosis of nuclear fragments by reticulum cells of the follicles.

THYMUS

Seven and nine days after inoculation with B virus alone or B virus combined with A serum, all thymi examined showed marked phago-

FIGURE 1—Lung, 15th day Squamous epithelial cells lining alveoli, interstitial infiltration ×200

FIGURE 2—Lung, 15th day Squamous epithelial cells filling alveoli ×400

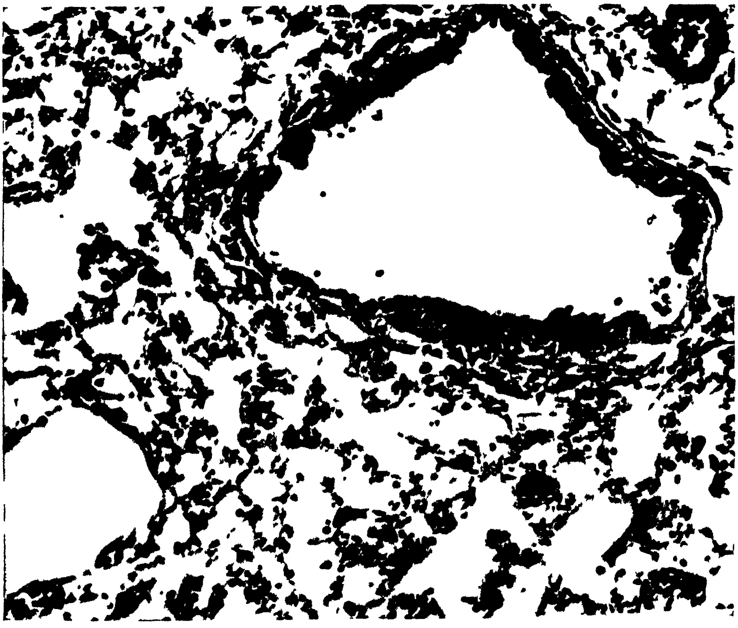

FIGURE 3—Lung, 9th day Degenerative and proliferative changes in bronchial epithelium, slight interstitial infiltration ×200

cytosis of nuclear fragments by large mononuclear cells in the cortex, and to a lesser extent in the medulla. Small thymic cells of the cortex were considerably replaced by the large mononuclear cells.

Prior to the seventh day similar changes were noted in the thymi from three mice. After the ninth day, a similar process was noted in only one mouse, but most of the thymi seen appeared small in section.

Only one of the 29 mice inoculated with B virus combined with B serum or a suspension of normal lung in saline showed thymic changes similar to those described above.

NOSE

A subacute inflammatory process of slight to moderate degree, involving foci in the respiratory mucosa of the anterior and middle portions of the nose, was found in 19 of the 42 mice inoculated with B virus alone or B virus combined with A serum. However, a similar inflammatory process was found in 7 of the 29 mice inoculated with B virus combined with B serum or a suspension of normal lung in saline, and in 3 of 6 normal (uninoculated) mice of the same age and weight as the test animals.

OTHER ORGANS

No significant lesions attributable to the virus were found in the heart, liver, pancreas, spleen, adrenals, testicles, bone marrow, spinal cord, or brain.

DISCUSSION AND SUMMARY

In this experiment, groups of young white Swiss mice were inoculated intranasally with each of the following: a suspension of type B influenza virus; B influenza virus combined with type A influenza antiserum; B influenza virus combined with type B antiserum; a suspension of normal mouse lung in saline.

Lesions were found in the trachea, bronchi, lungs, thymus, and mediastinal lymph nodes of the mice inoculated with B virus alone. The inflammatory reaction in the trachea, bronchi, and lungs was essentially similar (allowing for differences in the titer of the viruses) to the reaction described by several authors after the intranasal inoculation of the type A influenza virus (*4–8*). In the trachea and bronchi, the prominent changes were seen in the epithelium, with degeneration and exudation seen in the early stages and marked proliferation in the later stages. In the lungs, lesions were patchy and peribronchial and largely interstitial. In late stages the most characteristic feature was the plugging of alveoli by epithelial cells of the squamous type.

The histopathologic changes found in the thymus were involutional in type, and in the mediastinal lymph nodes the reaction was hyper-

plastic. These changes were possibly secondary to the inflammatory process in the trachea, bronchi, and lungs, and not due to a specific action by the virus. Similar changes in the thymi of mice inoculated intranasally with the virus of "Q" fever have been described (*9*). In other experimentally produced pneumonias (unpublished data), similar changes have been noted in both the thymus and the mediastinal lymph nodes.

In mice inoculated with B virus combined with A serum, the findings were indistinguishable from those seen in mice inoculated with the virus alone. There was, therefore, no evidence of cross immunity.

When B virus was combined with B serum, inoculated mice showed very few lesions and the changes did not resemble those produced by the virus alone. The virus was neutralized by the serum. Findings in mice inoculated with the suspension of normal lung in saline were similarly negative.

On the basis of this experiment it is considered impossible to differentiate between experimentally produced type A and type B influenza in mice by histologic examination alone.

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LABORATORY STUDIES OF THE EFFECT OF SULFONAMIDE DRUGS ON *V. CHOLERAE*[1]

By JAMES J. GRIFFITTS, *Assistant Surgeon, United States Public Health Service*

The sulfonamide drugs have had limited clinical trial in the treatment of cholera. In 1939, Pasricha, de Monte, Chatterji, and Mian

[1] From the Division of Biologics Control, National Institute of Health.

(*1*) reported a series of human cases in which sulfapyridine in doses of 2 gm. daily caused no favorable response in the disease. Recently, Chopra, de Monte, and Chatterji (*2*) used sulfaguanidine in a number of cases and indicated that, in spite of admittedly inadequate dosage, the drug was effective in the treatment of cholera.

Rao and Ganapathi (*3*) used mice inoculated intraperitoneally with 875,000,000 living cholera vibrios and reported that the subcutaneous injection of sulfanilamide, sulfapyridine, or sulfathiazole into these animals was ineffective in preventing deaths. This finding, as will be shown later, may be explained by the overwhelmingly large number of vibrios used by these workers as a challenge dose. However, they observed that sulfathiazole inhibited the growth of *V. cholerae, in vitro,* to a degree comparable to its action on streptococci.

It is the purpose of this report to describe further the effect of certain drugs of the sulfonamide group on the cholera vibrio, *in vitro*, and in experimental infections in mice.

EXPERIMENTAL STUDIES

In vitro experiments.—Serial dilutions of the drugs were made in sterile beef infusion broth. To each 5 cc. of broth containing the various amounts of drug approximately 5,000 living cholera vibrios were added. The tubes were incubated 24 hours at 37° C. and then held at room temperature (22°–25° C.) and observed for 7 days.

The *in vitro* effects of 5 different drugs of the sulfonamide group on the cholera vibrio were studied. Sulfanilamide, sulfathiazole, and sulfadiazine inhibited the growth of this organism (table 1) whereas sulfaguanidine and succinyl sulfathiazole did not prevent growth in the concentrations used.

TABLE 1.—*The inhibition of growth of Vibrio cholerae (strain No. 35) by sulfonamide drugs, in vitro* [1]

Drug	Duration of inhibitory effect [2] and concentration of drug					
	1:1000	1:2000	1:4000	1:8000	1:16000	Control no drug
Sulfathiazole	7 days	6 days	3 days	1 day	None	None.
Sulfadiazine	5 days	1 day	None	None	do	Do.
Sulfanilamide	2 days	None	do	do	do	Do.
Sulfaguanidine	None	do	do	do	do	Do.
Succinyl sulfathiazole	do	do	do	do	do	Do.

[1] Each tube inoculated with approximately 5,000 vibrios.
[2] All tubes were observed for 7 days.

Sulfathiazole in a 1:8000 concentration inhibited growth for 24 hours but the inhibitory effect of this and lower dilutions of the drug was overcome in the succeeding days. However, at the end of 7 days this drug in a 1:1000 dilution still prevented growth of the vibrio.

Sulfadiazine and sulfanilamide exerted an inhibitory effect on the vibrios which persisted 5 and 2 days, respectively.

The *in vitro* effect of sulfathiazole was the same on the Inaba and Ogawa strains of *V. cholerae*, and its action on these organisms compared favorably with its inhibition of growth of *Streptococcus hemolyticus* (table 2).

TABLE 2.—*Comparison of the inhibitory action of sulfathiazole on Inaba (No. 35) and Ogawa (No. 41) strains of V. cholerae and on Streptococcus hemolyticus (strain No. 1685)*

Organism	Approximate number of organisms inoculated into tubes	Duration of inhibitory effect [1] and concentration of drug				
		1:1000	1:2000	1:4000	1:8000	Control (No drug)
V. cholerae No. 35	5,000	7 days	3 days	1 day	None	None.
V. cholerae No. 41	5,000	do	do	do	do	Do.
Streptococcus hemolyticus No. 1685	10,000	5 days	do	3 days	do	Do.

[1] All tubes were observed for 7 days.

In vivo experiments.—The enhancement of the mouse killing capacity of *V. cholerae* in the presence of mucin has been described (*4*). The intraperitoneal injection of relatively small numbers of vibrios suspended in 5-percent mucin results in the death of mice within 24 to 48 hours. This method has been used to examine the action of the sulfonamide drugs on experimentally infected mice. This infection of mice is characterized by a massive bacteremia and is not, as in man, limited to the intestinal tract. Since mice succumb to the infection within 2 days, it is not possible to delay treatment longer than a few hours

Test animals.—White Swiss mice of a closely inbred strain, approximately 5 weeks old and weighing 12 to 14 gm, were used.

Infecting organisms.—Cholera strains No. 35 (Inaba) and No. 41 (Ogawa) were used as test organisms. Approximately 50,000 vibrios (10^{-4} dilution of a suspension of vibrios in saline having a turbidity equal to 500 parts per million of silica standard) of strain No. 35 when suspended in mucin are sufficient to kill 70 percent of mice injected intraperitoneally, while ten times this number of vibrios kills 90 to 100 percent of mice. Five thousand organisms of strain No. 41 in mucin when injected intraperitoneally kill 70 to 80 percent of mice while ten times this number kills 90 to 100 percent of the animals injected.

The test doses were prepared by serial dilutions of saline suspensions of vibrios grown 5 hours at 37° C. on beef infusion agar slants. The final dilution, i. e., the dose to be inoculated, was made in 5-percent mucin suspension. The number of organisms injected was estimated

by pour plate colony counts on 1 cc. quantities of the 10^{-7} dilution of the original suspension.

Administration of drugs.—Drugs given subcutaneously were suspended in distilled water, while intragastric doses were prepared in 5-percent acacia and injected into the stomach of the mouse with a blunt 20-gage hypodermic needle. The dosages of the drugs were contained in 0.25 cc. and were given one-half to one hour after the infecting dose had been injected.

Period of observation.—The mice were observed for 7 days following the injection of the test doses. Alternate mice dying in the control groups were examined and the presence of cholera peritonitis was confirmed by finding many vibrios in Gram stained smears of the peritoneal fluid In the treated groups, cholera vibrios were found in smears from the peritoneal cavity of each mouse dying within 48 hours but in those dying later, vibrios were not found.

Results—Mice were given approximately 500,000 living vibrios in mucin by intraperitoneal injection as the challenge dose. Ninety percent of the control animals died within 24 hours while of those given a single injection of sulfathiazole or sulfadiazine 80 to 90 percent survived for 24 hours, and 50 percent survived the 7-day test period (table 3). Succinyl sulfathiazole given subcutaneously showed no beneficial effect.

TABLE 3.—*The effect of a single subcutaneous injection of drugs on infections in mice with V. cholerae* [1]

Drug	Dose of drug	Number of mice	Distribution of deaths by days							Number surviving 7 days	Percent surviving
			1	2	3	4	5	6	7		
Sulfathiazole	10 mg	48	9	7	1	5	0	1	1	24	50
Sulfadiazine	10 mg	46	4	10	4	4	1	0	0	23	50
Succinyl sulfathiazole	10 mg	39	28	4	2	1	1	0	0	3	7 7
Normal saline	0 25 cc	40	37	2	0	0	0	0	0	1	2.5

[1] Each mouse was injected intraperitoneally with approximately 500,000 vibrios, strain No 35, in mucin, one-half to one hour prior to the injection of drugs

Sulfathiazole acted favorably on mice infected with either Inaba or Ogawa strains of cholera vibrio (table 4). As shown in this table, the effect of injecting this drug into mice, previously inoculated with cholera organisms, depended on the number of vibrios contained in the infecting dose. The number of survivors was greatest in the groups given only 5,000 organisms while fewer survived doses containing ten to one thousand times this number of vibrios.

Drugs of the sulfonamide groups when administered by stomach tube were effective against cholera infections in mice (table 5). Succinyl sulfathiazole and sulfaguanidine protected mice as well as sulfathiazole when given intragastrically, although neither inhibited growth of the vibrio *in vitro*.

TABLE 4.—*The effect of a single subcutaneous injection of 10 mg. of sulfathiazole in mice previously injected with various numbers of V. cholerae (strain Nos. 35 and 41) in mucin*

Strain	Approximate number of vibrios injected intraperitoneally	Test group[1]			Control group[2]		
		Number of mice	Number surviving 7 days	Percent surviving	Number of mice	Number surviving 7 days	Percent surviving
Inaba 35	5,000,000	10	5	50			
	500,000	10	8	80	10	0	0
	50,000	10	10	100	10	3	30
	5,000	10	9	90	10	5	50
Ogawa 41	500,000	10	2	20	10	0	0
	50,000	10	7	70	10	1	10
	5,000	10	9	90	10	3	30

[1] Each mouse received 10 mg of sulfathiazole suspended in 0 25 cc. of distilled water, one-half to one hour after the infecting dose was given

[2] Each mouse received 0 25 cc of normal saline subcutaneously as a control injection

TABLE 5.—*The effect of drugs, given intragastrically, on* V. cholerae *infections in mice* [1]

Drug	Dose of drug	Number of mice	Distribution of deaths by days							Total surviving 7 days	Percent surviving
			1	2	3	4	5	6	7		
Sulfathiazole	20 mg, then 5 mg b i d for 4 days	20	3	3	0	0	0	0	0	14	70
Sulfadiazine	do	10	3	1	0	0	0	0	0	6	60
Sulfaguanidine	do	10	3	0	0	0	0	0	0	7	70
Succinyl sulfathiazole	do	10	3	0	0	0	0	0	0	7	70
Normal saline	0 25 cc	20	16	2	0	0	0	0	0	2	10

[1] Each mouse was injected intraperitoneally with approximately 500,000 vibrios, strain No 35, in mucin, one-half to one hour prior to the administration of the drug.

SUMMARY

1. Sulfathiazole, sulfadiazine, and sulfanilamide inhibited the growth of *V. cholera, in vitro.*
2. Sulfathiazole and sulfadiazine, given subcutaneously or intragastrically, were effective in the treatment of mice previously inoculated with lethal doses of cholera vibrios in mucin.
3. Succinyl sulfathiazole and sulfaguanidine given intragastrically were effective in the treatment of mice experimentally infected with *V. cholerae.*

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MORBIDITY AND MORTALITY DURING 1941 AND RECENT PRECEDING YEARS

MORBIDITY

The following data concerning the prevalence of eight communicable diseases are based on reports submitted by the health officers of the several States and the District of Columbia (table 1). Although cases of each of these diseases are reportable by law, there is considerable variability in the completeness of the reports. The number of cases reported is somewhat smaller than the number of cases which occur during any given year, but it is believed that the reports are sufficiently accurate to reveal any unusual prevalence arising from an epidemic.

Diseases above the median prevalence.—The number of reported cases of influenza was 2.3 times greater than the median number for the 5-year period 1936–40 and 1.6 times greater than the number reported during 1940 (fig. 1). The epidemic started in November 1940 in Arizona and California and spread rapidly eastward across the southern part of the country. The peak was reached around the middle of January 1941; the number of cases reported for that month was the largest since 1929. Although some increase in the number of cases of influenza occurred in the North Central and Northeastern States, the epidemic was most severe in the Western and Southern States. Fortunately the cases were very mild so that the death rate increased only 8.6 percent compared with the rate for 1940.

TABLE 1.—*Number of reported cases of certain communicable diseases in the United States in 1940 and 1941 and the median number of cases reported, 1936–40*

Disease	1941		1940		Median 1936–40	
	Cases	Number of States reporting [1]	Cases	Number of States reporting [1]	Cases	Number of States reporting [1]
Diphtheria	18,061	48	15,536	48	28,536	48
Influenza [2]	681,969	45	429,837	45	298,384	45
Measles	891,652	48	291,162	48	321,510	48
Meningitis, meningococcus	2,021	48	1,665	48	2,934	48
Poliomyelitis	9,057	48	9,826	48	7,343	48
Scarlet fever	128,490	48	155,464	48	189,631	48
Smallpox	1,374	48	2,795	48	9,877	48
Typhoid and paratyphoid fever	8,562	48	9,809	48	14,903	48

[1] The District of Columbia is included but not counted as a State.
[2] Massachusetts, New York, and Pennsylvania are not included.

Figures for 1941 are preliminary.

Measles was even more prevalent than influenza during 1941. The number of reported cases was 2.8 times greater than the median number for 1936–40 and 3.1 times the number reported in 1940. The epidemic started in November 1940, spread slowly until about the

middle of January 1941, after which the number of cases increased rapidly until the peak of the epidemic was reached during the first

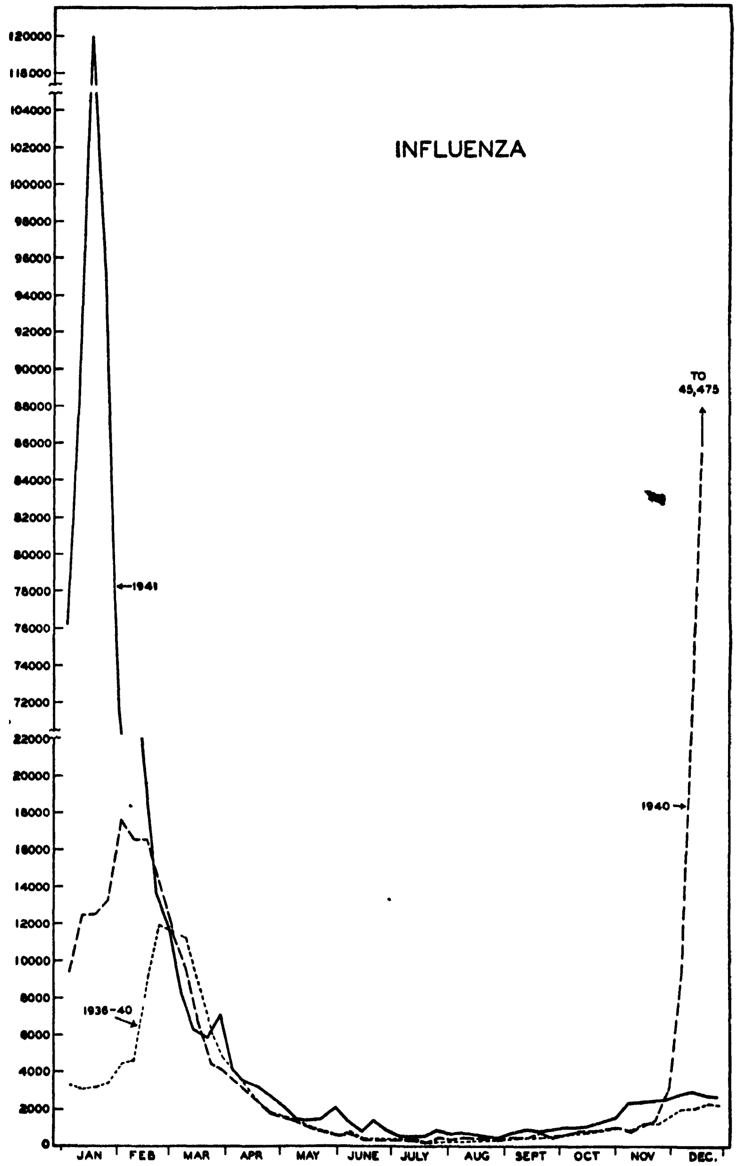

FIGURE 1.—Number of reported cases of influenza by weeks for 1941, 1940, and the median number for 1936–1940.

part of April 1941. At the peak of the epidemic from March 22 to April 19, the number of reported cases was the largest on record for that period; the epidemic was especially severe in the Middle Atlantic,

East North Central, South Atlantic, and East South Central regions; only the New England and Pacific Coast States escaped.

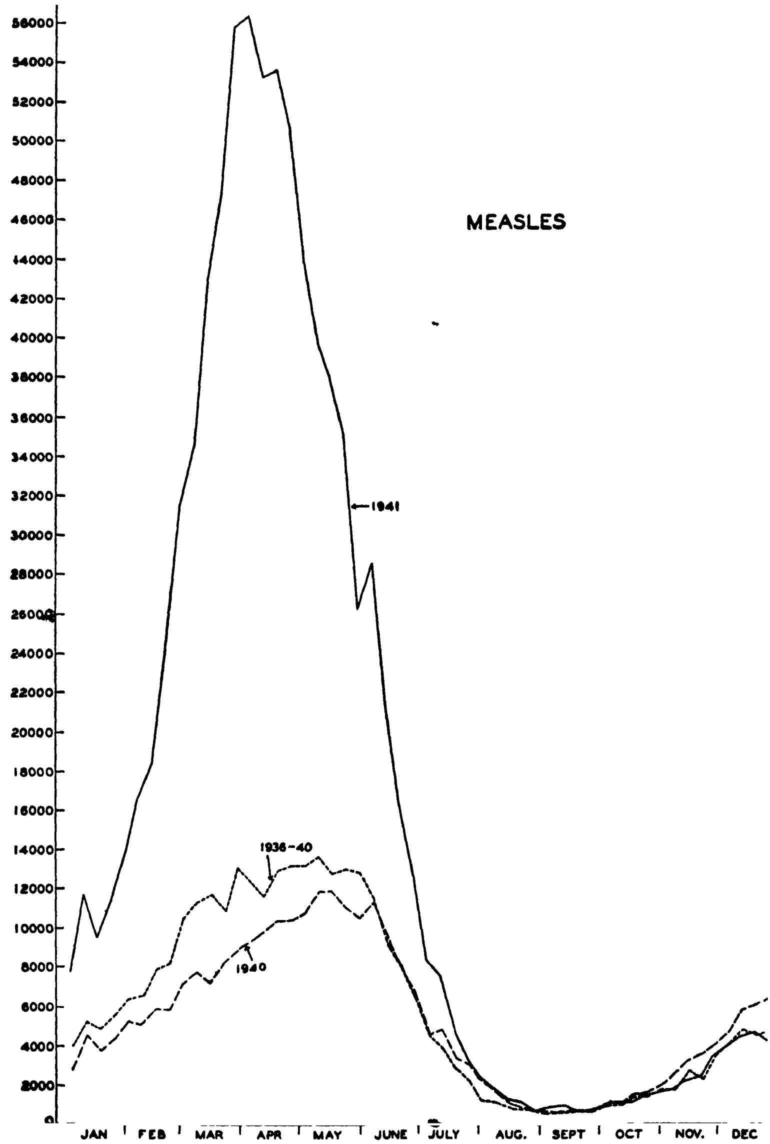

FIGURE 2.—Number of reported cases of measles by weeks for 1941, 1940, and the median number for 1936–1940.

The only other communicable disease more prevalent than normal during 1941 was poliomyelitis. Although the number of reported cases exceeded the median number for 1936–40 by about 23 percent it was nearly 8 percent less than the number reported in 1940. The

outbreak was confined mostly to the Atlantic coast and East South Central States; in the remainder of the country the prevalence was well below the average seasonal number of cases.

Diseases below the median prevalence.—The numbers of reported cases of diphtheria, meningococcus meningitis, scarlet fever, smallpox, typhoid and paratyphoid fever were all less than the respective median number for the previous 5-year period, although diphtheria and meningitis were more prevalent than during 1940. The decline in the number of reported cases of smallpox was especially noteworthy, the number of reported cases being only 14 percent of the median for the previous 5 years.

MORTALITY

The annual mortality rates in table 2 are based on preliminary data for 31 States and the District of Columbia. In addition comparative mortality rates by quarters for the past 3 years are shown in table 3. Death rates for 1941 for 34 States, the District of Columbia, Alaska, and Hawaii are presented in table 4.

This report is made possible through a cooperative arrangement with the respective States which voluntarily furnish provisional tabulations of current birth and death records to the United States Public Health Service which provides for the publication of the data. Because of lack of uniformity in the method of classifying deaths according to cause, and the impossibility of including a certain number of delayed certificates, these data are preliminary and may differ in some instances from the final figures subsequently published by the Bureau of the Census.

Data for preceding years from the same source, collected and tabulated in the same way as the current data, are included for comparative purposes. These figures are used in preference to the final figures published by the Bureau of the Census because it is believed that they are more comparable with current provisional information.

In the past these preliminary reports have provided an early accurate index of the trend of mortality for the country as a whole. Some deviation from the final figures for individual States may be expected because of the provisional nature of the reports. It is believed, however, that the trend of mortality within each State is correctly represented. Comparisons of specific causes of death among the States are subject to some error because of differences in tabulation procedure and completeness of reporting. Such comparisons should be made from final figures published by the Bureau of the Census.

Preliminary reports indicate that the death rate from all causes was about 2 percent less in 1941 than in 1940 and also was slightly less than the lowest previous death rate, that for 1938 and 1939. The decrease in the mortality rate was widespread since only 6 of the 34

States for which data are available reported a higher rate in 1941 than in 1940.

Diseases with lower death rates.—With the exception of influenza, cancer, and accidents, the death rate from each of the important causes of death was lower in 1941 than in 1940. For the following causes the rate in 1941 was the lowest for the past 5 years; typhoid fever, scarlet fever, diphtheria, tuberculosis, malaria, pellagra, pneumonia, diseases of the digestive system, and diseases of pregnancy and childbirth.

The maternal mortality rate declined for the twelfth consecutive year; the rate for 1941, 3.0 per 1,000 live births, was only two-thirds of the corresponding rate in 1937. Rivaling the percentage decrease

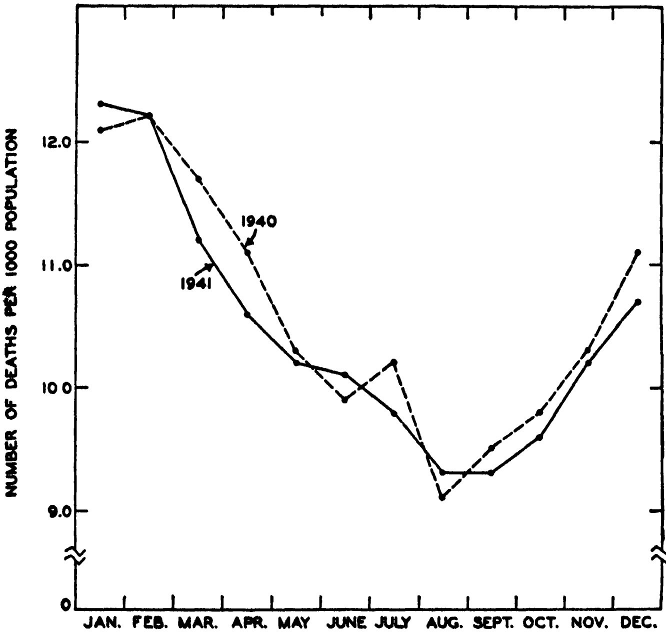

FIGURE 3.—Death rates per 1,000 population, by months, 1941 and 1940.

in the maternal mortality rate has been the decline in the death rate from pneumonia which reached a low of 46.6 per 100,000 population in 1941. This is the lowest death rate from pneumonia on record in this country and represents a decline of 45 percent since 1937. Only 2 of the 34 States reported a higher rate in 1941 than in 1940.

The infant mortality rate showed no change during the past year; in fact, there has been practically no change in this rate since 1939. The present rate, 45 per 1,000 live births, is still far above that which it is possible to achieve with present knowledge. It is possible that the slowing up in the decline in the infant mortality rate may be

caused in part by an improvement in the completeness of registration of infant deaths.

The death rate from tuberculosis continued its decline so that the 1941 rate was about 2 percent less than that for 1940. It will require special efforts to prevent this disease from increasing its toll in the next few years for tuberculosis death rates increase almost universally during a war. In England and Wales the number of deaths from respiratory tuberculosis had increased 10 percent by the middle of 1941 if the period from July 1938 to July 1939 is taken as a base. The number of deaths from nonrespiratory tuberculosis increased about 18 percent during the same period.

Diseases with higher death rates.—The death rates from influenza and measles were both higher in 1941 than in 1940 due primarily to epidemics of these diseases. Fortunately the epidemic of influenza, although widespread, was unusually nonfatal so that the death rate increased only 8.6 percent and was only about one-half the rate in 1937. The death rate from cancer increased from 120 to 121 per 100,000 population.

TABLE 2 —*Summary of mortality trends from certain causes in a group of 32 States, 1937–41* [1] *(estimated population July 1, 1941, 58,071,800)*

[Rates provisional for all years]

Diseases (numbers in parentheses are from the International List of Causes of Death, revised February 1940 for 1938 International List)	1941	1940	1939	1938	1937
	Rate per 1,000 population				
Deaths, all causes	10 4	10 6	10 5	10 5	11 1
Births, exclusive of stillbirths	18 2	17 4	17 0	17 4	16 9
	Rate per 1,000 live births				
Infant mortality (live births, 1941, 1,604,850)	45	45	46	49	52
Maternal mortality	3 0	3 5	3 8	4 1	4 5
	Rate per 100,000 population				
Typhoid and paratyphoid fever (1, 2)	6	8	1 1	1 3	1 6
Cerebrospinal (meningococcus) meningitis (6)	5	5	.5	8	1 6
Scarlet fever (8)	4	5	7	9	1 4
Whooping cough (9)	2 5	1 9	2 1	3 2	3 4
Diphtheria (10)	7	9	1 3	1 7	1 8
Tuberculosis, all forms (13–22)	42 2	43 0	44 4	45 9	50 8
Malaria (28)	.5	7	8	1 0	1 2
Influenza (grippe) (33)	15 1	13 9	16 2	11 5	27 4
Measles (35)	1 6	3	7	2 8	.9
Acute poliomyelitis and acute polioencephalitis (36)	.6	7	5	3	.8
Acute infectious encephalitis (lethargic) (37)	7	6	5	6	.6
Cancer and other malignant tumors (45–55)	121 2	120 3	117 2	115 3	112 0
Diabetes mellitus (61)	26 6	27 3	26 5	24 8	24 7
Pellagra (except alcoholic) (69)	1 1	1 2	1 5	1 9	2 0
Cerebral hemorrhage, embolism, and thrombosis (83a, b)	90 1	92 7	88 7	85 9	87 6
Diseases of the heart (90–95)	295 4	297 5	285 1	271 0	268 1
Pneumonia, all forms (107–109)	46 6	53 2	58 6	65 7	84.2
Diseases of the digestive system (115–129)	53 5	54 6	58 0	61 9	64 1
Diarrhea and enteritis under 2 years (119)	7 4	5 8	7 0	9 6	9 4
Nephritis, all forms (130–132)	72 2	77 2	71 6	74 6	77.1
All accidents, including automobile accidents (169–195)	72.7	69,2	69,0	68,8	78,8
Automobile accidents only (170a, b, c)	27 5	23 7	22 3	22 5	27 0

[1] The States included are all of those except Rhode Island and South Dakota listed in tables 4 and 5. The District of Columbia is counted as a State

As was anticipated, the death rate from automobile accidents increased sharply during 1941, the rate, 27.5 per 100,000 population being 16 percent higher than the rate for the previous year. This increase nullifies the decrease in the relative number of fatal automobile accidents which had occurred during the past few years. The death rate from all other forms of accidents decreased slightly during the past year.

BIRTH RATE

The birth rate increased nearly 5 percent during 1941 and is now the highest it has been since 1929. The increase is due almost entirely to an increase in first and second births and cannot be expected to continue.

TABLE 3.—*Trends of mortality from certain causes in each quarter of 1941, 1940, and 1939 in the 38* [1] *States with available data (estimated population July 1, 1941, 88,071, 800)*

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths), per 1,000 population (annual basis)	Rate per 1,000 live births		Death rate per 100,000 population (annual basis)																				
			Total infant mortality	Maternal mortality	Typhoid and paratyphoid fever (1-2)	Cerebrospinal (meningococcus) meningitis (6)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Tuberculosis, all forms (13-22)	Influenza (grippe) (33)	Measles (35)	Acute poliomyelitis and polioencephalitis (36)	Acute infectious encephalitis (lethargic) (37)	Cancer, all forms (45-55)	Diabetes mellitus (61)	Cerebral hemorrhage, embolism, and thrombosis (83a, b)	Diseases of the heart (90-95)	Pneumonia, all forms (107-109)	Diseases of the digestive system (115-129)	Diarrhea and enteritis, under 2 years (119)	Nephritis, all forms (130-132)	All accidents, including automobile accidents (169-195)	Automobile accidents (170a, b, c)
January-December:																								
1941	10.4	18.2	45	3.0	0.6	0.5	0.4	2.5	0.7	42.2	15.1	1.6	0.6	0.7	121.2	26.6	90.1	296.4	46.6	58.5	7.4	72.2	72.7	27.5
1940	10.6	17.4	45	3.5	.8	.5	.5	1.9	.9	43.0	13.9	.3	.7	.6	120.3	27.3	92.7	297.5	53.2	54.6	5.8	77.2	69.2	23.7
1939	10.5	17.0	46	3.8	1.1	.5	.7	2.1	1.3	44.4	16.2	.7	.5	.5	117.2	26.5	88.7	285.1	58.6	58.0	7.0	71.6	69.0	22.3
January-March:																								
1941	11.9	17.2	52	3.1	.3	.7	.5	2.9	.7	45.5	43.6	1.6	.3	.5	120 6	31.7	100.8	346.3	81.0	49.6	3.2	83.3	66.8	22.9
1940	12.0	16.2	52	4.1	.4	.7	.8	1.7	1.2	45.2	32.1	.5	.2	.5	121 7	32.1	104.7	341.7	86.3	52.7	3.3	87.5	65.4	18.9
1939	11.8	16.4	54	4.2	.6	.7	1.1	2.3	1.5	46.1	33.7	1.3	.1	6	117.9	30.8	98.3	326.3	106.0	55.1	4.3	81.9	63.5	18.0
April-June:																								
1941	10.3	17.6	44	3.3	.5	.5	.4	2.9	.3	45.5	8.6	3.8	.2	.5	120.9	26.8	89.9	292.6	40.5	50.9	4.7	74.6	68.9	23.9
1940	10 5	17.0	44	3.9	.6	.5	.5	1.9	.5	46.2	11.0	.5	.2	.7	119.4	26.4	91.4	296.8	47.7	52.5	4.6	78.8	64.4	20.5
1939	10.4	16.5	46	4.0	.8	.5	.7	2.3	.6	47.3	17.1	1.2	.2	.4	116.7	26.2	87.5	280.5	51.8	57.1	6.2	72.9	65.3	18.8
July-September:																								
1941	9.5	19.8	39	3.0	1.0	.4	.2	2.5	.5	39.2	2.5	.7	1.2	1.2	121.1	22.6	80.2	252.1	24.6	61.4	13.3	62.4	78.0	29.5
1940	9.6	18.5	39	3.3	1.4	.3	.3	1.8	.5	41.4	3.1	.2	1.5	.6	120.0	23.7	84.0	257.3	27.7	61.7	9.2	68.4	74.4	24.9
1939	9.3	17.8	41	3.5	1.9	.4	.3	2.0	.8	41.4	3.5	.2	.8	.5	114.9	22.3	77 6	241.8	25.8	64.6	11.3	62.0	72.4	23.7
October-December:																								
1941	10.2	18.3	44	2.7	.7	.5	.4	1 8	1.4	38.6	6.3	.4	.7	.5	122.1	25.3	89.7	291.5	41.0	52.1	8.2	70.0	76.9	33.4
1940	10.5	17.8	46	2.9	.7	.4	.4	2.2	1.3	39 2	9.7	.1	.9	.5	120.2	27.2	90.8	294.8	51.5	51.2	6.1	74.2	72.5	30.3
1939	10.5	17.0	46	3.5	1.1	.4	.6	1.7	2.3	42.5	10.6	.2	.7	.4	119 5	26.7	91.5	292.7	51.7	55.1	6.3	69.8	74.5	28.7
Metropolitan Life Insurance Co., industrial policyholders [2] (January-December):																								
1941	7.4	-----	-----	-----	.5	-----	.4	1.3	.7	42.8	7.8	.8	-----	-----	104.8	27.4	60.6	[3] 156.1	30.5	-----	5.0	[4] 51.9	50.1	20.8
1940	7.6	-----	-----	-----	.7	-----	.6	1.2	.8	44.6	7.9	.3	-----	-----	104.4	29.8	61.0	[3] 159.5	35.5	-----	4.6	[4] 57.3	46.5	18.2
1939	7.6	-----	-----	-----	.7	-----	.7	1.6	1.3	45.2	9.9	.6	-----	-----	101.7	27.7	59 7	[3] 161.0	42.8	-----	5.4	[4] 51.8	46.2	18.3

[1] The States included are all of those except Rhode Island, South Dakota, and Illinois listed in tables 4 and 5. The District of Columbia is counted as a State.

[2] These data are taken from the Statistical Bulletin published by the Metropolitan Life Insurance Co. The figures are subject to correction, since they are based on provisional estimates of lives exposed to risk. Data do not include all diseases reported to the Public Health Service.

[3] Excludes pericarditis, acute endocarditis, and acute myocarditis.

[4] Chronic nephritis only.

TABLE 4.—*Trend of death rates from all causes, of birth rates, and of infant and maternal mortality rates, 1937–41*

[Rates provisional for all years]

State	Deaths, all causes (rate per 1,000 population)					Births, exclusive of stillbirths (rate per 1,000 population)					Infant mortality (rate per 1,000 live births)					Maternal mortality (rate per 1,000 live births)				
	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937
Alabama	10.1	10.2	10.2	10.7	11.2	22.4	22.3	22.3	22.5	22.2	60	62	60	61	63	5.2	6.1	5.8	6.2	5.9
Connecticut	9.2	9.5	10.0	10.3	10.5	13.6	11.8	12.5	13.8	13.3	32	38	38	36	41	2.4	3.5	2.9	2.7	2.9
Delaware	11.8	12.1	11.8	12.0	13.9	18.1	16.5	16.3	16.7	16.6	43	51	44	51	66	2.2	5.0	4.7	5.7	4.4
District of Columbia	13.0	13.0	12.7	12.6	14.2	27.1	22.8	21.5	20.6	20.0	50	47	47	48	61	2.6	2.8	4.7	5.4	5.3
Florida	11.7	11.9	11.4	11.6	12.6	18.5	17.2	17.0	16.9	17.7	54	54	57	58	60	6.4	6.3	6.4	7.3	6.8
Georgia	9.7	10.0	9.7	10.5	10.9	20.8	20.2	19.9	20.2	20.1	59	58	59	68	63	4.4	5.2	5.5	6.6	7.4
Idaho	8.4	9.3	9.2	9.0	9.6	22.4	22.4	21.9	22.3	21.2	34	41	45	45	45	2.3	3.2	2.5	3.7	3.9
Illinois	9.4	11.2	11.0	10.8	11.2	16.9	15.6	15.0	15.5	14.8	34	35	38	41	43	2.5	2.9	3.0	3.3	3.8
Indiana	10.9	11.3	11.1	10.9	11.6	17.5	16.9	15.6	16.2	15.0	39	39	41	45	52	2.8	2.7	3.9	3.8	3.7
Iowa	9.4	9.8	9.9	9.6	9.9	16.4	17.9	17.0	16.7	16.9	38	34	39	38	41	2.6	3.1	2.6	3.1	4.0
Kansas	10.2	10.2	10.3	10.2	10.5	17.0	15.9	16.0	16.3	16.0	37	38	39	43	45	2.4	3.6	3.4	4.0	4.1
Kentucky	10.3	10.3	10.4	9.8	10.8	21.2	21.7	20.8	24.6	22.1	58	46	54	49	50	4.0	3.8	4.4	3.8	3.8
Maine	12.4	12.4	12.8	12.3	13.6	18.2	17.5	17.6	18.2	18.6	51	54	51	49	61	2.6	4.2	4.2	4.2	5.4
Maryland	11.9	12.1	11.5	11.7	12.5	18.8	16.7	15.7	16.4	15.6	55	49	50	55	62	2.2	2.7	3.3	3.4	4.1
Massachusetts	11.9	11.8	11.6	11.2	11.6	(1)	15.3	14.7	13.8	13.9	(1)	38	39	40	44	(1)	2.5	3.5	3.9	4.6
Michigan	9.8	9.9	10.1	10.0	10.8	19.8	18.8	18.3	19.1	18.5	39	41	42	45	48	2.7	2.9	2.9	3.5	3.6
Montana	10.0	10.2	10.6	10.2	10.9	20.4	20.4	19.4	19.2	18.5	37	46	50	43	49	1.7	3.5	3.2	3.7	3.4
Nebraska	9.2	9.5	9.1	9.0	9.8	16.7	16.5	16.5	16.5	16.3	34	36	34	36	42	2.3	3.2	3.4	3.4	3.9
Nevada	11.5	11.9	11.3	11.7	12.2	18.2	18.6	17.3	17.2	15.2	41	50	44	45	44	2.9	4.9	4.2	1.6	6.9
New Jersey	10.9	10.8	10.5	10.5	10.7	15.7	14.1	13.6	13.6	13.2	36	36	38	39	39	2.7	2.8	2.9	3.5	3.4
New Mexico	10.3	10.5	10.9	11.0	12.8	26.6	29.8	30.0	29.0	27.6	97	93	96	99	124	3.9	4.4	4.3	4.6	5.0
New York	10.8	11.1	11.1	11.0	11.6	15.5	14.6	14.1	14.2	14.0	33	37	39	40	45	2.3	2.9	3.0	3.8	3.9
North Carolina	8.9	9.0	9.0	9.7	9.9	23.5	23.0	22.7	23.0	23.3	59	56	58	68	65	4.1	5.3	4.8	5.6	5.4
North Dakota	8.1	7.9	8.4	7.9	8.6	21.0	20.9	20.8	20.2	20.0	39	41	48	48	53	1.8	1.6	2.3	2.2	4.8
Ohio	11.2	11.3	11.2	10.9	11.7	17.5	16.3	15.6	16.4	15.6	41	39	45	42	50	2.5	3.3	3.6	3.7	4.6
Oklahoma	8.6	8.7	8.9	8.5	9.2	19.3	19.0	18.8	19.2	17.6	49	50	52	43	59	3.0	3.5	4.2	4.0	6.9
Pennsylvania	10.7	10.9	10.7	10.8	11.5	17.8	16.3	16.3	16.8	16.4	39	44	44	46	50	2.2	2.5	3.2	3.5	4.0
Rhode Island	10.9	11.2	11.0	11.8	12.0	16.0	15.1	14.7	15.0	14.7	36	38	40	44	50	2.1	2.4	3.2	2.5	3.4
South Dakota	8.8	8.7	8.9	7.4	9.3	18.9	19.0	18.0	18.0	17.6	41	39	41	45	52	2.2	3.7	3.0	3.5	4.2
Tennessee	9.7	10.0	9.7	10.0	10.5	19.5	18.2	17.6	17.9	18.0	56	55	54	64	60	3.8	4.8	5.5	5.6	6.2
Utah	8.2	8.9	8.5	8.8	9.1	24.4	24.4	23.1	24.3	23.1	30	40	37	45	41	1.7	2.4	2.8	3.2	3.3
Vermont	11.4	11.6	11.7	11.6	12.2	18.0	18.4	15.9	15.7	17.6	40	36	36	43	45	2.2	3.8	3.3	3.0	4.9
Virginia	11.2	11.0	10.7	10.9	11.1	21.1	20.1	19.4	19.8	19.4	68	60	62	69	64	4.0	4.4	4.9	5.1	5.0
Wisconsin	9.6	10.0	9.9	9.8	10.4	17.4	17.3	17.2	17.4	17.0	36	37	40	42	44	2.5	2.6	2.8	2.9	3.5
Wyoming	8.6	8.5	8.9	9.0	10.2	20.1	19.9	19.7	19.5	18.9	45	47	45	53	53	2.3	4.4	3.5	3.5	3.5
Alaska	18.2	17.4	16.5	17.8	16.6	26.6	23.7	21.2	25.9	19.1	96	110	121	78	131	5.0	2.3	3.3	5	4.5
Hawaii	7.4	7.3	7.5	7.9	8.8	23.5	22.6	21.7	22.1	22.4	41	44	54	59	69	2.5	2.2	3.5	3.8	4.7

[1] Data not available.

Table 5.—*Trends of death rates for various causes per 100,000 population, 1937–41*

[Rates provisional for all years]

State	Typhoid and paratyphoid fever (1, 2)					Cerebrospinal (meningococcus) meningitis (6)					Scarlet fever (8)					Whooping cough (9)				
	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937
Alabama	0.8	1.6	1.7	2.1	2.0	0.7	0.8	.8	2.2	4.1	0.5	0.5	0.5	0.6	0.4	4.7	4.2	5.9	6.0	6.8
Connecticut	3	3	4	4	4	1	4	2	2	8	1	(1)	2	2	7	5	2	1.3	7	1.4
Delaware	(1)	7	2.6	1.5	2.3	(1)	7	1.5	4	1.5	7	1.1	4	8	4	2.2	2.2	3.0	5.4	6.6
District of Columbia	7	7	8	1.0	2.0	6	7	6	1.4	4.9	(1)	3	2	5	8	1.5	1.6	2.3	1.0	2.8
Florida	1.4	1.3	1.5	2.5	2.9	8	4	5	8	4.0	1	1	3	2	1	1.9	1.7	3.1	3.6	3.5
Georgia	1.7	2.0	2.6	3.9	4.4	5	3	5	6	1.2	3	5	5	4	4	4.3	3.3	4.0	7.3	4.6
Idaho	9	1.1	3.1	2.9	1.8	6	9	1.7	1.8	1.0	4	1.3	4	1.0	1.8	3.5	1.3	1.9	2.7	3.2
Illinois	4	4	1.4	8	7	2	2	2	3	1.2	5	8	9	1.7	2.0	1.1	8	2.0	2.2	1.9
Indiana	6	8	1.1	7	1.1	5	3	4	7	1.6	7	1.2	1.4	2.0	3.0	1.4	2.2	1.8	1.3	4.7
Iowa	2	4	6	8	9	5	6	4	6	1.0	3	7	9	1.8	3.8	1.5	9	1.7	2.6	3.4
Kansas	3	6	7	7	9	5	6	4	3	1.4	3	5	7	1.4	3.6	3.2	1.8	4	2.8	2.5
Kentucky	2.7	2.5	4.3	4.9	5.7	1.1	1.2	1.2	2.2	3.1	9	1.0	1.1	1.5	1.8	7.9	6.1	2.4	6.6	8.6
Maine	4	6	1.1	1.9	1.7	1.2	1.1	4	1	1.1	1	.7	4	(1)	5	2.2	2.5	3.6	3.0	3.1
Maryland	9	6	9	1.8	1.8	1.1	3	6	7	2.5	2	4	3	5	8	4.2	3.5	1.1	2.9	5.5
Massachusetts	1	2	3	3	3	6	3	4	6	1.5	3	3	3	6	9	1.0	5	1.0	8	2.2
Michigan	2	2	6	6	6	2	2	3	4	8	6	8	1.3	1.7	3.0	1.6	1.2	1.5	2.3	2.7
Montana	4	7	2.2	9	2.0	7	1.2	9	1.8	1.3	1.4	1.6	1.6	1.8	2.0	1.1	9	2.9	8.6	2.5
Nebraska	4	4	4	5	1.1	5	3	2	4	1.1	3	9	1.0	1.1	2.6	2.4	8	1.0	2.6	2.1
Nevada	2.7	9	9	2.8	(1)	(1)	9	9	(1)	1.0	(1)	(1)	(1)	(1)	1.9	3.5	2.7	(1)	2.8	1.9
New Jersey	2	3	4	4	7	3	1	5	5	1.1	2	4	5	3	4	9	6	1.1	1.3	1.2
New Mexico	1.8	3.0	3.2	4.1	5.6	2	6	1.0	8	1.0	4	6	4	1.0	1.4	9.7	9.5	7.1	12.3	9.6
New York	2	3	3	5	5	5	4	5	8	1.2	2	3	4	5	7	7	1.0	1.0	1.3	1.3
North Carolina	9	1.1	1.3	2.0	2.3	4	3	5	9	1.2	3	3	4	6	5	5.5	2.5	6.4	7.6	4.9
North Dakota	2	6	6	3	5	2	3	5	1.4	2.0	3	8	1.1	2.8	1.8	2.4	2.2	2.0	9.7	1.5
Ohio	5	7	7	8	1.5	2	4	2	7	1.4	4	6	1.1	1.2	1.9	2.6	1.8	1.2	1.8	4.2
Oklahoma	1.5	2.5	3.4	4.1	5.8	3	9	5	1.0	2.1	2	3	7	9	1.4	5.0	2.4	1.0	7.9	3.6
Pennsylvania	5	6	6	9	1.1	3	6	6	7	1.3	3	5	6	1.2	1.5	1.5	1.3	1.5	1.7	2.7
Rhode Island	1	1.0	1	4	1	3	3	6	9	2.2	3	(1)	(1)	4	1.6	6	3	2.0	1.1	3.0
South Dakota	3	(1)	1.2	1.2	1.1	3	6	8	3	1.1	2	6	1.2	1.1	3.0	4.2	6	9	7.8	3.2
Tennessee	1.5	2.1	3.3	3.7	4.9	1.2	6	7	1.7	2.5	5	5	6	7	7	5.4	3.9	3.3	7.1	4.8
Utah	7	5	4	4	7	4	5	9	1.3	1.7	[illegible]	1.1	4	9	1.7	1.6	1.8	1.1	2.8	2.6
Vermont	8	8	3	3	1.1	8	1.4	6	(1)	2.5	6	3	1.1	3	3	(1)	1.7	6.7	3.1	8
Virginia	1.1	1.0	1.8	2.1	2.0	1.5	1.2	9	1.6	4.1	3	4	3	3	3	7.0	4.7	5.8	7.1	8.1
Wisconsin	2	1	2	2	4	1	2	2	3	7	6	7	1.1	1.2	2.2	9	1.1	1.4	1.8	2.0
Wyoming	1.2	8	2.8	2.0	1.2	1.6	2.8	8	8	2.5	8	4	4	2.4	3.7	1.6	4	4	13.4	4.9
Alaska	2.7	(1)	(1)	1.4	1.4	4.0	1.4	(1)	(1)	12.9	(1)	(1)	8.3	1.4	1.4	5.3	21.8	26.3	53.6	31.6
Hawaii	1.2	2.4	1.9	2.4	1.7	(1)	5	5	5	5	(1)	(1)	(1)	2	(1)	1.6	1.9	7.2	5.4	2.5

[1] No deaths reported

State	Diphtheria (10)					Tuberculosis, all forms (13–22)					Malaria (28)					Influenza (grippe) (33)				
	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937
Alabama	2.4	2.1	2.9	3.8	3.5	51.5	52.1	55.2	57.4	63.0	4.2	7.0	7.2	7.9	8.2	34.2	32.7	34.4	26.7	52.0
Connecticut	([1])	.2	.4	.7	1.4	31.6	32.4	34.3	36.8	37.9	([1])	([1])	([1])	([1])	([1])	4.8	4.4	4.7	4.5	12.2
Delaware	.4	([1])	.8	.8	.4	54.4	46.8	57.1	50.1	56.1	([1])	([1])	([1])	([1])	([1])	11.8	10.5	12.9	10.7	22.8
District of Columbia	.3	.4	.8	1.1	2.3	66.6	64.0	66.1	71.7	90.4	.1	.1	.2	([1])	([1])	4.9	6.9	9.2	5.2	16.0
Florida	1.1	1.4	1.9	1.9	3.2	45.7	50.0	49.4	54.5	57.5	4.3	5.2	6.1	8.9	12.2	26.6	28.8	27.7	20.7	39.5
Georgia	1.6	1.8	2.9	3.3	3.4	41.4	47.2	46.4	50.4	49.7	2.3	2.8	3.1	4.9	7.0	31.7	28.7	29.1	24.9	44.9
Idaho	.2	.2	.8	.6	1.2	15.7	17.8	18.7	19.4	20.3	([1])	.8	.2	([1])	([1])	12.0	17.8	17.5	16.3	38.8
Illinois	.7	1.1	1.5	1.5	2.0	43.7	46.2	45.8	47.0	51.1	.1	.2	.4	.4	.5	6.4	8.1	12.3	5.6	17.1
Indiana	.7	1.0	1.6	2.4	1.6	36.3	37.6	41.4	39.4	46.8	([1])	.3	.2	.3	.6	19.8	21.9	26.0	12.7	33.3
Iowa	.3	.5	.6	1.0	.4	13.6	16.0	17.4	18.3	20.5	([1])	([1])	([2])	([2])	.1	13.3	15.9	23.7	12.6	32.7
Kansas	.5	.7	.4	1.0	1.3	22.5	24.7	23.5	23.6	27.2	.2	.3	.1	.2	.2	23.0	18.4	18.9	15.8	34.8
Kentucky	1.9	1.8	3.2	4.0	4.9	66.3	66.4	70.3	69.7	72.4	.6	.6	1.1	1.1	1.4	35.6	28.2	33.8	25.5	50.7
Maine	.4	.7	2.1	2.0	.6	29.3	29.5	35.1	30.2	32.4	([1])	.1	([1])	([1])	([1])	18.0	12.6	20.2	15.3	28.6
Maryland	.4	.4	1.1	1.0	1.2	74.0	78.6	72.1	74.4	79.3	([1])	([1])	([1])	.2	.1	9.8	8.4	9.7	7.4	16.5
Massachusetts	.3	.2	.3	.4	.4	38.6	37.4	37.1	38.1	42.1	([2])	([1])	([2])	([2])	([2])	6.6	3.4	5.4	3.6	9.7
Michigan	.4	.4	.5	.9	1.4	32.0	33.3	36.5	37.0	42.9	.1	([1])	([2])	([1])	.1	8.1	5.1	14.5	6.3	17.3
Montana	2.5	1.1	1.6	1.6	1.4	35.7	40.2	42.7	42.5	42.5	([1])	([1])	([1])	([1])	([1])	16.2	13.7	23.3	19.1	54.1
Nebraska	.3	.8	1.0	1.2	1.1	15.4	17.0	16.5	16.4	19.5	([1])	([1])	([1])	([1])	([1])	23.1	19.9	17.1	11.3	42.2
Nevada	([1])	.9	([1])	2.8	([1])	47.9	67.7	52.4	58.1	82.1	([1])	([1])	([1])	([1])	([1])	6.2	11.7	6.4	.9	8.6
New Jersey	.2	.6	.6	.8	.7	43.0	42.8	43.2	46.2	48.8	([1])	([1])	([2])	([1])	([1])	5.3	4.2	5.8	4.8	10.5
New Mexico	1.6	1.3	2.9	3.3	3.6	64.3	70.7	72.6	76.7	106.3	1.5	.7	.8	.2	([1])	14.7	13.7	19.9	10.7	32.7
New York	.1	.1	.2	.3	.6	45.5	46.2	47.9	48.8	56.0	([2])	.1	.2	.3	.2	4.0	3.1	4.1	3.5	9.9
North Carolina	2.5	3.3	4.9	5.1	4.8	48.8	49.7	51.0	53.6	54.6	.9	1.8	1.7	2.2	2.7	24.9	21.1	17.9	14.2	25.4
North Dakota	.9	1.4	2.0	.9	1.7	19.5	20.0	21.9	21.6	28.1	([1])	([1])	([1])	([1])	([1])	11.0	9.2	17.5	11.7	29.8
Ohio	.4	.4	.9	1.3	1.6	42.1	39.9	42.6	45.1	48.7	.1	.1	([2])	([2])	([1])	14.4	14.7	18.7	11.1	29.7
Oklahoma	2.9	3.2	3.3	5.2	4.1	45.1	47.6	45.7	48.9	52.4	2.2	1.0	2.2	3.5	3.6	23.9	24.4	21.9	17.2	43.5
Pennsylvania	.2	.4	.7	1.0	1.0	38.1	39.5	40.2	42.2	47.0	([1])	([1])	([2])	([2])	.1	10.9	10.8	12.3	10.1	27.6
Rhode Island	.1	.3	.1	.1	.4	37.2	33.0	[illegible]	39.6	46.1	([1])	([1])	([1])	([1])	([1])	5.3	4.3	5.1	4.7	10.8
South Dakota	1.9	.8	3.2	1.5	.8	28.8	34.3	29.2	36.4	39.0	([1])	([1])	([1])	([1])	([1])	13.6	15.4	21.1	14.7	40.5
Tennessee	1.7	1.6	3.0	3.7	4.8	76.8	72.8	78.5	76.2	84.8	1.8	2.2	3.4	3.6	3.6	32.2	31.0	31.8	26.0	47.9
Utah	.2	([1])	.9	1.1	1.1	11.5	15.8	16.3	18.3	19.7	([1])	([1])	([1])	([1])	([1])	8.8	19.8	12.8	9.4	23.2
Vermont	([1])	([1])	.8	3.6	.6	28.9	36.5	39.0	37.1	50.4	([1])	([1])	([1])	([1])	([1])	17.2	12.8	25.9	14.2	32.1
Virginia	1.6	2.0	3.7	4.4	3.2	60.0	58.5	60.0	66.5	62.8	.1	.2	.3	.1	.3	28.4	25.1	22.2	19.1	40.3
Wisconsin	([2])	.2	.1	.5	.8	24.6	26.0	27.3	29.5	33.1	([1])	([2])	([1])	([1])	([1])	10.3	11.4	17.3	7.6	37.5
Wyoming	2.4	1.6	1.2	2.8	([1])	14.2	15.9	22.9	23.2	18.1	.4	([1])	([1])	([1])	([1])	22.4	10.7	11.3	12.6	44.4
Alaska	1.3	4.1	1.4	2.8	([1])	426.5	365.9	361.5	409.2	365.2	1.3	([1])	([1])	([1])	([1])	62.8	10.9	22.2	36.7	34.5
Hawaii	.5	1.4	1.0	.5	2.7	60.2	61.2	66.9	65.1	79.1	([1])	([1])	([1])	([1])	([1])	2.6	8.5	3.8	5.4	9.2

[1] No deaths reported.
[2] Less than 1/10 of 1 per 100,000 inhabitants.

TABLE 5.—*Trends of death rates for various causes per 100,000 population, 1937–41*—Continued

State	Measles (35)					Acute poliomyelitis and polioencephalitis (36)					Acute infectious encephalitis (lethargic) (37)					Cancer and malignant tumors (45–55)				
	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937
Alabama	3.6	1.2	2.1	6.0	0.1	2.3	0.7	0.5	0.6	0.7	0.3	0.6	0.4	0.6	0.4	63.3	64.4	60.3	59.4	59.6
Connecticut	.1	.2	.5	.1	.7	.1	.1	.1	(1)	.5	.1	.2	.1	.1	.4	132.3	136.0	138.6	143.1	130.5
Delaware	2.2	(1)	(1)	.8	1.5	.7	.7	.4	.4	.4	.7	(1)	1.1	(1)	.4	118.7	138.4	109.4	117.5	120.0
District of Columbia	.6	(1)	.3	.3	2.1	1.3	.4	.2	.5	.7	.1	.7	.2	.5	.8	159.4	151.3	156.4	137.6	142.1
Florida	.9	.3	.7	1.5	.3	1.7	.4	.3	.6	.3	.4	.3	.4	.5	(2)	100.7	93.9	92.6	84.3	97.3
Georgia	4.8	.7	1.6	4.8	.3	1.0	.2	.5	.6	.6	.2	.1	.1	.3	.2	65.1	60.7	61.3	60.6	57.6
Idaho	.2	.9	.8	.8	2.8	.2	.6	1.5	.2	.4	.9	.9	1.5	1.2	.8	86.9	88.6	89.1	83.1	81.9
Illinois	1.1	.2	(2)	2.6	.3	.3	.7	.3	.2	1.2	.3	.3	.2	.4	.5	145.8	143.0	141.9	137.1	132.3
Indiana	1.6	.1	.2	3.1	.4	.4	2.1	.1	.3	.8	.1	.6	.5	.7	.5	121.8	122.3	112.1	113.8	110.0
Iowa	.5	.5	1.1	1.0	.2	.2	2.2	1.1	.4	1.5	.7	.8	.7	1.0	.6	128.4	130.1	124.5	128.5	126.1
Kansas	1.8	.9	.2	1.3	.2	.4	2.2	.3	(1)	1.9	1.6	.8	1.6	1.2	1.3	120.8	122.3	124.4	123.9	118.6
Kentucky	5.5	.6	1.1	3.8	3.0	1.1	1.4	1.2	1.0	1.1	.1	.5	.8	.3	.7	82.6	82.9	81.2	73.8	71.6
Maine	1.3	1.1	.6	2.1	.4	.6	.2	.7	.5	1.8	.4	.4	.6	.1	.2	152.2	151.5	151.7	151.1	147.4
Maryland	.7	.1	.9	.4	2.2	.3	.3	.1	.1	1.0	.8	.4	.4	.9	1.4	141.7	138.1	131.8	128.6	127.8
Massachusetts	.1	.3	.4	.3	.6	.2	(2)	.1	.2	.5	.3	.2	.2	.2	.3	176.8	171.2	160.4	160.4	151.0
Michigan	1.2	.3	.6	2.0	.2	.3	1.3	.8	.2	1.0	.3	.3	.1	.2	.2	116.3	117.8	116.7	114.2	111.8
Montana	.2	.9	2.9	2.0	.7	1.8	1.4	(1)	.4	1.3	2.5	1.8	1.4	5.4	.9	111.5	110.7	114.8	98.2	104.6
Nebraska	.3	.5	1.0	.8	.3	.8	1.6	.6	.5	3.3	1.3	.5	.4	.8	.9	125.3	124.8	117.9	122.2	115.0
Nevada	(1)	(1)	1.8	(1)	(1)	(1)	.9	(1)	(1)	(1)	.9	(1)	(1)	(1)	(1)	113.6	114.7	112.2	102.1	67.7
New Jersey	.6	.2	.1	.7	1.3	.4	.1	.7	.2	.5	.4	.6	.5	.7	.6	148.8	146.2	140.3	134.3	131.5
New Mexico	9.2	.9	.8	10.0	8.6	.4	.6	1.5	.8	1.4	.4	(1)	.4	(1)	(1)	54.6	58.4	52.9	52.7	48.1
New York	.3	.1	.4	.7	.4	.4	.1	.4	.2	.4	.8	.9	.4	.7	.6	156.0	158.0	154.4	151.6	147.6
North Carolina	2.7	.3	1.8	7.0	1.2	.4	.3	.3	.3	.6	.3	.3	.2	.4	.4	59.0	57.5	56.2	54.5	54.7
North Dakota	.3	.3	3.4	2.9	(1)	.2	.6	.3	(1)	(1)	20.9	2.0	1.7	4.2	.6	92.4	95.8	98.1	94.8	87.5
Ohio	1.6	(2)	.1	2.6	1.5	.7	.8	.2	.2	.8	.7	.5	.6	.4	1.0	137.2	135.1	132.1	127.5	119.6
Oklahoma	.9	.2	3.2	2.4	1.0	.6	1.2	.4	1.0	2.5	.4	.6	.6	.3	.3	82.9	82.6	78.6	75.3	77.9
Pennsylvania	1.0	.1	.1	2.4	.8	.6	.3	.5	.2	.5	.7	.6	.6	.7	.7	124.4	123.6	123.3	121.0	119.2
Rhode Island	.1	.4	.4	(1)	.4	.4	.3	(1)	.1	(1)	.6	.3	(1)	.6	.3	148.4	157.4	151.1	154.9	153.7
South Dakota	.3	.5	4.3	.8	(1)	.9	.8	.6	.3	1.2	.3	.2	.5	1.1	1.2	99.7	105.3	104.3	91.1	87.9
Tennessee	4.3	.6	1.5	6.9	1.1	1.5	.3	.5	.7	1.2	.5	.6	.7	.5	.8	85.6	73.5	70.9	73.0	68.9
Utah	(1)	.9	.4	2.0	.7	.2	1.1	1.3	(1)	1.3	.9	.4	.9	.2	.9	86.7	90.5	91.8	84.8	88.1
Vermont	.6	(1)	1.7	3.3	(1)	.3	.3	1.4	1.1	.6	(1)	.3	.3	.3	(1)	141.9	137.2	140.4	132.9	146.9
Virginia	6.2	.8	.8	3.4	2.5	.4	1.0	.3	.3	.5	.1	.7	.3	.2	.6	83.7	81.3	80.3	80.5	73.7
Wisconsin	.7	.3	.6	1.2	.2	.6	1.4	.4	1.2	1.2	.6	.8	.3	.3	.5	131.8	132.9	127.3	130.2	126.7
Wyoming	.8	2.4	.4	(1)	.4	(1)	2.8	1.2	1.2	2.9	[illegible]	1.6	(1)	.8	1.6	81.9	84.7	75.1	83.3	73.9
Alaska	46.8	159.1	54.0	1.4	4.3	2.7	(1)	(1)	1.4	2.9	(1)	(1)	1.4	(1)	1.4	82.9	74.8	70.0	66.3	61.8
Hawaii	1.2	(1)	(1)	.2	46.7	1.4	1.2	1.4	.5	.5	.5	(1)	.2	.5	.2	76.5	67.3	71.2	67.1	74.4

State	Diabetes mellitus (61)					Pellagra (except alcoholic) (69)					Cerebral hemorrhage, embolism, and thrombosis (83a, b)					Diseases of the heart (90-95)				
	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937
Alabama	11.4	12.1	12.2	12.5	10.8	6.1	8.5	10.0	12.4	11.2	83.9	77.9	70.1	71.9	69.9	174.7	178.7	170.6	173.4	168.8
Connecticut	31.6	22.8	29.2	30.1	31.7	.2	.2	.1	.1	.3	79.1	99.1	82.1	88.1	88.5	309.9	299.4	296.1	254.7	243.3
Delaware	27.7	31.8	33.7	33.7	30.2	.4	(1)	(1)	(1)	(1)	99.9	105.5	115.4	98.0	115.0	350.2	355.1	363.3	365.9	367.3
District of Columbia	27.6	32.2	26.8	26.0	29.3	(1)	.1	.2	.6	.8	88.7	92.9	88.8	83.8	97.3	330.5	347.2	344.1	341.7	334.2
Florida	20.2	19.5	20.6	18.2	17.7	3.2	3.8	4.0	5.7	6.2	108.0	111.6	98.5	96.0	113.7	277.6	284.5	243.6	241.9	241.3
Georgia	11.8	10.9	11.4	13.1	12.2	6.2	7.3	8.5	11.6	11.8	93.8	94.4	93.1	85.2	83.8	178.0	190.8	167.0	165.8	168.6
Idaho	18.7	17.8	20.0	13.7	12.3	(1)	.6	.4	(1)	(1)	74.3	61.7	60.9	61.3	68.7	204.9	242.9	241.8	203.2	148.0
Illinois	28.7	33.3	30.0	27.7	27.3	.2	.2	.3	.2	.2	74.9	81.9	75.1	73.6	72.2	340.0	349.6	338.6	316.3	304.1
Indiana	14.5	14.7	16.6	16.1	15.1	(1)	.1	.1	.1	.5	137.1	141.0	132.2	123.2	123.4	269.0	304.4	249.6	238.2	251.4
Iowa	23.7	26.5	24.5	22.0	21.7	(1)	(1)	.2	(2)	.2	100.2	106.1	103.1	99.7	104.9	273.3	279.8	268.2	245.6	223.7
Kansas	24.0	26.0	26.7	24.6	23.9	.4	.4	.3	.3	.4	105.2	101.3	101.1	102.3	100.4	279.2	275.1	259.1	247.1	230.5
Kentucky	15.6	14.3	13.0	13.3	11.1	1.4	1.9	2.8	2.2	2.7	92.2	104.1	106.6	100.1	91.8	220.7	215.9	217.9	188.0	173.6
Maine	31.4	31.1	27.3	27.5	24.0	.2	(1)	.5	.2	.1	124.1	129.4	126.7	115.6	130.9	369.2	361.1	376.9	343.7	369.7
Maryland	31.1	31.3	29.2	27.1	25.0	(2)	.2	.4	.3	.4	89.2	97.0	96.3	96.5	102.8	338.3	346.7	313.7	308.5	298.2
Massachusetts	36.3	36.5	35.1	33.3	34.1	.2	.1	.2	.2	.3	105.3	105.5	103.4	97.9	97.1	430.8	421.9	407.3	372.6	366.9
Michigan	33.0	26.6	26.2	25.3	25.4	.1	.2	(2)	.1	(2)	85.8	89.9	82.6	86.4	85.0	291.0	295.2	287.1	273.7	266.6
Montana	13.7	11.6	17.2	17.7	19.7	.2	(1)	.2	(1)	.2	95.4	96.4	84.7	92.1	83.6	241.0	237.6	231.9	208.5	215.4
Nebraska	25.7	26.8	25.0	25.4	26.7	.1	.1	(1)	.1	.2	100.4	114.0	91.4	85.4	90.5	234.9	234.4	210.2	223.3	225.4
Nevada	17.7	20.8	9.2	12.2	13.4	(1)	.9	.9	(1)	1.0	71.0	65.9	67.2	76.8	71.6	299.0	309.7	264.0	266.9	246.2
New Jersey	35.7	36.4	33.6	30.7	31.9	.2	.3	.1	.2	.2	94.3	90.3	86.6	84.6	80.4	357.2	358.9	356.7	339.3	325.4
New Mexico	10.4	9.4	8.6	7.2	6.8	2.0	3.6	2.9	3.5	3.6	40.3	40.2	38.8	43.0	43.3	115.1	116.2	108.5	113.4	121.9
New York	39.5	40.5	39.1	35.5	36.3	.1	.1	.2	.2	.2	71.3	72.2	66.9	63.3	73.1	383.5	384.4	366.6	355.7	353.9
North Carolina	12.1	13.6	13.8	10.9	11.1	3.8	4.7	5.8	7.3	9.5	79.8	84.7	80.2	81.9	80.1	160.9	152.2	161.5	164.1	161.0
North Dakota	19.3	25.6	21.9	21.0	19.0	(1)	.2	(1)	(1)	(1)	72.3	69.3	77.7	69.0	73.0	202.5	205.6	206.4	160.4	177.4
Ohio	28.9	31.2	29.2	27.0	26.5	.2	.1	.1	(1)	(2)	104.1	111.1	107.9	104.1	106.4	312.2	315.2	298.0	276.6	427.6
Oklahoma	14.7	14.0	14.7	13.8	13.8	2.1	2.2	4.2	4.5	4.3	78.3	80.6	85.9	68.0	67.5	182.9	162.4	152.1	140.1	140.5
Pennsylvania	33.8	35.4	33.8	31.1	32.0	.1	.1	.1	.1	.1	84.4	83.6	83.3	83.1	82.3	333.8	335.0	324.2	313.0	313.2
Rhode Island	37.8	38.7	36.9	40.4	41.5	(1)	(2)	.3	.3	.1	87.0	99.8	87.6	94.3	96.8	374.4	372.9	362.8	352.8	362.0
South Dakota	25.5	23.9	26.7	19.6	20.6	.2	.2	(1)	(1)	(1)	81.5	82.0	76.1	71.1	72.6	207.5	207.4	201.1	172.4	174.9
Tennessee	12.4	14.0	13.4	11.1	11.5	4.8	3.6	5.1	7.1	7.1	78.5	83.2	80.7	81.2	80.6	176.4	186.8	173.5	162.6	161.5
Utah	19.4	19.6	18.3	19.9	18.4	(1)	.4	.2	(1)	.2	60.3	58.4	54.1	52.0	58.2	242.4	245.9	233.4	224.3	229.0
Vermont	29.5	27.6	32.6	30.1	20.1	.3	(1)	(1)	(1)	.3	113.2	119.4	115.9	110.9	103.4	357.7	332.1	359.6	301.5	332.2
Virginia	19.2	20.3	17.5	16.6	16.6	1.7	2.1	2.2	4.2	4.0	102.6	104.3	104.1	97.2	92.3	251.5	248.0	245.6	236.8	227.9
Wisconsin	27.9	28.1	27.0	28.1	25.2	.2	.1	.1	.2	.1	92.2	96.0	85.9	84.4	86.6	290.3	295.6	298.8	274.9	263.5
Wyoming	11.8	14.3	16.5	13.8	10.7	.4	(1)	.4	(1)	(1)	64.1	66.0	57.5	57.3	81.3	216.5	201.3	208.7	206.9	245.2
Alaska	5.3	4.1	4.2	1.4	5.8	1.3	(1)	(1)	(1)	(1)	72.2	76.2	59.6	125.6	61.8	197.9	208.1	227.2	242.7	279.0
Hawaii	20.2	14.4	16.6	16.8	17.5	(1)	(1)	(1)	(1)	.5	52.8	43.7	47.6	54.9	45.4	135.1	128.5	126.3	126.6	119.8

[1] No deaths reported
[2] Less than 1/10 of 1 per 100,000 inhabitants.

TABLE 5.—*Trends of death rates for various causes per 100,000 population, 1937–41*—Continued

State	Pneumonia, all forms (107–109)					Diseases of the digestive system (115–129)					Diarrhea and enteritis under 2 years (119)					Nephritis, all forms (130–132)				
	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937
Alabama	53.8	58.6	68.9	78.9	94.0	(1)	54.9	58.8	69.0	66.8	12.4	12.5	13.9	18.6	16.2	84.8	93.8	69.6	79.8	81.3
Connecticut	28.1	38.3	42.3	51.0	69.5	45.0	44.7	48.5	49.7	49.3	2.1	1.9	2.1	3.4	3.1	61.8	55.5	76.4	80.7	80.4
Delaware	53.6	58.4	70.4	68.9	97.1	56.6	52.0	52.6	65.5	72.8	10.4	4.9	5.3	12.2	9.7	133.9	134.3	106.7	105.3	137.4
District of Columbia	73.7	80.1	72.4	86.6	124.0	94.3	83.0	81.3	76.6	81.6	24.4	10.2	11.5	11.4	11.9	113.4	110.0	105.2	102.0	100.4
Florida	48.0	56.1	56.2	68.5	73.4	69.6	68.3	76.8	82.8	98.5	9.0	7.6	10.5	12.1	11.0	85.9	89.3	91.2	90.6	100.3
Georgia	48.7	63.0	68.7	85.0	94.5	52.7	50.4	57.5	69.8	67.8	13.5	12.5	13.0	22.0	15.4	103.1	103.7	91.6	110.2	108.6
Idaho	30.4	41.2	56.7	76.2	75.9	44.1	55.0	56.1	54.5	70.5	1.5	6.5	5.8	4.9	9.0	58.1	57.1	53.2	54.9	62.7
Illinois	40.0	47.3	54.0	58.6	70.5	57.3	59.0	62.0	65.0	69.5	3.3	2.5	3.1	5.5	4.6	85.7	91.6	92.3	92.1	96.2
Indiana	49.3	58.6	68.7	70.6	94.5	(1)	46.0	50.2	56.0	53.7	6.2	3.5	5.5	8.6	8.8	67.0	73.9	64.6	64.9	65.8
Iowa	39.7	48.9	50.3	61.2	65.3	44.8	49.8	53.9	55.5	55.6	1.8	2.1	2.3	3.4	3.9	56.9	64.0	54.4	57.1	59.1
Kansas	35.7	35.9	43.8	51.3	61.1	52.8	55.0	60.2	61.9	64.1	2.7	3.8	4.0	5.1	6.2	92.9	95.7	97.1	95.7	89.5
Kentucky	56.8	62.3	73.1	76.3	93.8	66.1	57.8	66.8	77.3	75.6	20.4	13.7	19.0	30.4	23.4	75.6	73.9	65.8	72.1	69.4
Maine	54.2	54.8	74.1	75.7	96.1	56.0	53.4	55.5	59.1	60.7	6.1	5.3	5.6	7.8	14.4	88.6	88.3	81.4	83.8	83.6
Maryland	58.4	61.9	67.5	75.4	103.4	60.0	50.9	53.9	58.5	65.6	17.2	6.7	9.4	11.3	13.1	117.7	127.5	118.9	124.6	131.8
Massachusetts	61.0	61.1	71.3	73.5	94.5	55.0	53.9	55.7	56.2	60.5	4.0	3.0	2.0	2.7	2.8	62.9	70.4	67.2	68.8	70.4
Michigan	41.4	46.8	54.1	56.7	83.0	50.4	52.8	57.7	60.0	64.1	4.9	3.3	5.2	6.2	5.7	52.8	53.9	54.2	54.7	59.3
Montana	45.9	58.7	66.2	74.6	101.5	62.4	69.8	67.8	66.9	71.7	4.8	7.0	5.2	5.8	6.9	55.8	57.0	57.9	56.6	56.6
Nebraska	34.8	46.9	51.7	54.7	62.3	44.2	52.4	55.4	52.4	63.0	1.3	2.4	2.2	2.4	4.1	64.4	64.4	65.8	60.5	64.7
Nevada	52.4	69.5	81.9	103.0	120.2	74.5	69.5	42.3	63.7	69.7	4.4	3.6	3.7	4.7	4.8	51.5	58.7	40.5	72.1	78.2
New Jersey	41.8	44.5	44.2	57.8	70.0	53.1	54.5	56.4	59.2	60.3	3.2	2.3	2.8	3.1	3.3	75.0	77.0	67.7	73.4	74.1
New Mexico	55.1	58.4	83.9	79.1	107.9	85.2	85.9	89.4	96.3	127.3	46.5	41.7	38.0	43.3	74.4	48.2	46.6	44.3	50.8	45.7
New York	42.7	45.5	55.3	61.5	86.0	52.7	57.1	59.2	60.4	66.3	2.7	3.0	4.3	4.6	5.8	58.5	65.6	65.7	69.2	74.0
North Carolina	54.6	57.0	61.4	78.3	85.2	53.3	52.1	63.5	76.6	71.7	19.6	13.1	19.0	29.5	24.9	84.6	95.7	82.4	88.2	85.4
North Dakota	35.5	40.2	54.8	54.5	72.7	44.9	49.1	53.7	53.1	59.4	3.5	5.8	7.0	7.6	10.9	45.2	43.5	41.0	44.0	38.5
Ohio	44.0	56.0	60.0	60.8	84.9	55.1	52.8	55.5	57.8	66.7	7.7	4.4	5.1	6.8	8.0	73.0	77.1	75.6	75.5	77.8
Oklahoma	49.5	57.4	61.3	62.1	78.6	48.3	59.7	64.6	61.0	70.7	4.7	10.4	9.4	10.3	14.1	55.9	61.9	54.7	61.6	67.1
Pennsylvania	42.0	50.8	50.2	60.4	79.4	48.6	52.1	52.5	55.6	57.6	4.6	3.8	4.5	5.4	6.2	82.9	94.4	82.0	83.0	87.6
Rhode Island	43.8	54.0	57.4	79.2	93.2	57.5	55.2	60.3	60.7	59.7	3.0	2.0	4.0	5.1	5.1	97.5	98.0	96.1	102.4	106.8
South Dakota	38.3	36.5	54.8	55.5	73.4	45.6	53.8	60.0	55.0	57.0	2.6	5.1	5.4	5.7	4.8	54.8	48.2	42.8	40.6	46.1
Tennessee	61.5	71.0	70.6	80.6	95.4	56.8	58.8	64.7	75.8	76.9	12.7	10.6	12.8	22.1	18.0	65.4	64.5	59.8	63.8	66.7
Utah	30.8	43.5	45.2	63.1	61.5	43.9	54.8	53.4	63.3	65.5	2.5	3.6	2.2	5.3	3.7	50.4	49.9	53.9	52.2	55.2
Vermont	45.3	70.4	79.1	79.1	103.7	50.3	50.9	51.0	53.5	51.0	4.5	4.7	3.6	2.8	2.8	81.5	76.5	79.7	81.4	77.5
Virginia	59.4	69.5	67.3	71.8	98.3	56.7	48.2	53.1	60.0	53.8	17.2	8.8	11.1	16.2	12.8	98.7	105.0	85.3	83.8	86.8
Wisconsin	37.2	46.5	47.8	54.5	64.4	(1)	(1)	51.0	50.5	51.6	2.4	3.2	4.6	4.8	4.5	53.2	57.7	56.7	59.5	65.5
Wyoming	42.5	39.4	49.9	62.6	111.3	44.9	51.7	63.1	67.5	71.1	2.8	6.0	6.0	8.9	13.6	63.8	52.5	69.6	54.5	39.4
Alaska	121.7	144.2	169.0	186.3	159.6	58.8	28.6	41.6	38.1	56.1	4.3	4.1	(1)	(1)	8.6	38.8	23.1	27.7	16.9	15.8
Hawaii	39.3	45.8	54.1	75.1	93.3	40.2	48.2	53.2	54.9	66.1	8.1	5.7	11.1	12.4	19.0	52.8	66.9	65.2	62.7	72.1

[1] Data not available.

State	All accidents, including automobile accidents (169–195)					Automobile accidents only (170a, b, c)				
	1941	1940	1939	1938	1937	1941	1940	1939	1938	1937
Alabama	75.2	57.2	70.9	69.8	75.8	26.8	20.8	22.0	21.2	24.4
Connecticut	61.5	55.1	61.3	72.2	71.0	21.8	18.0	20.7	19.8	24.9
Delaware	81.7	79.0	71.9	80.4	107.6	34.4	36.3	29.1	26.8	43.3
District of Columbia	77.7	72.2	75.6	64.6	84.1	25.7	22.2	22.8	20.7	28.4
Florida	107.5	96.4	93.1	92.7	105.1	38.6	36.9	36.5	39.4	42.8
Georgia	67.8	63.6	55.9	67.3	75.9	28.8	24.8	19.9	24.9	29.8
Idaho	91.7	100.6	97.4	88.2	102.6	35.5	36.4	33.7	33.5	36.0
Illinois	76.6	73.7	71.3	74.7	81.5	32.2	29.6	28.4	27.7	33.4
Indiana	89.8	82.1	72.3	74.3	89.5	40.4	33.4	29.3	31.6	40.7
Iowa	65.2	63.5	65.8	65.8	76.2	22.9	20.0	19.4	19.1	24.2
Kansas	78.7	75.3	103.5	106.5	117.1	29.6	27.2	23.1	24.6	27.6
Kentucky	78.8	77.7	77.4	65.5	75.2	29.9	26.0	23.0	22.0	27.5
Maine	80.2	75.4	71.8	69.0	76.3	25.5	23.6	22.1	22.2	19.1
Maryland	79.8	79.4	69.8	68.6	87.7	30.9	28.3	22.0	21.7	30.6
Massachusetts	66.6	61.3	63.1	61.4	65.3	18.3	15.2	15.4	15.4	19.3
Michigan	81.8	74.9	72.4	70.8	90.1	39.1	32.6	27.3	27.5	40.0
Montana	100.2	94.1	94.2	101.6	105.3	35.4	27.7	27.1	24.1	32.4
Nebraska	63.9	65.2	69.0	59.0	68.2	20.6	19.9	21.3	17.4	24.6
Nevada	229.8	173.4	190.4	139.8	152.7	101.2	76.8	69.9	56.2	57.3
New Jersey	66.3	64.7	59.1	61.5	76.0	24.4	22.5	20.4	21.3	28.0
New Mexico	98.2	88.1	85.4	80.4	105.7	41.2	39.8	38.6	28.9	41.5
New York	61.6	62.1	61.9	63.4	71.3	19.4	18.0	17.8	18.3	22.2
North Carolina	72.1	65.3	65.2	63.2	72.7	59.4	27.5	26.2	25.1	30.2
North Dakota	62.6	53.5	51.8	55.7	63.8	18.7	18.1	14.4	19.0	20.9
Ohio	88.9	87.3	83.2	80.5	93.3	35.1	29.7	27.7	27.4	36.4
Oklahoma	62.1	56.7	82.3	73.3	66.7	22.0	19.7	22.2	23.8	26.2
Pennsylvania	57.4	57.2	54.7	59.5	68.6	19.4	17.2	16.7	17.6	22.4
Rhode Island	55.4	51.4	51.4	91.4	55.0	12.3	12.2	10.9	11.3	17.8
South Dakota	72.6	64.7	54.8	66.3	63.1	24.5	19.5	21.5	21.4	16.6
Tennessee	65.3	62.2	62.0	62.0	69.9	23.9	18.6	19.4	19.8	25.1
Utah	85.8	83.8	78.6	93.7	95.0	37.8	33.4	29.8	39.8	37.6
Vermont	62.3	61.2	66.3	68.8	70.0	22.3	19.2	22.0	20.6	18.1
Virginia	92.8	82.9	74.4	70.7	73.6	39.3	31.1	30.2	25.2	29.2
Wisconsin	72.6	75.0	76.3	68.4	79.4	27.7	24.2	22.8	22.3	28.4
Wyoming	113.3	106.2	113.4	109.3	124.5	49.2	53.7	47.4	39.4	51.3
Alaska	203.2	142.8	144.1	175.0	178.3	[1]	[1]	[1]	[1]	1.4
Hawaii	68.6	54.8	47.6	58.8	57.1	19.8	13.9	14.2	18.3	16.7

[1] No deaths reported.

NATIONAL HEALTH SURVEY

LIST OF PUBLICATIONS*

The National Health Survey was a project executed by the United States Public Health Service, with the aid of grants from the Work Projects Administration.** The field observations were obtained in 1935–36. The project comprised a number of individual studies, including: (*a*) A house-to-house canvass of sickness and medical care among 2,500,000 persons in 83 cities and certain rural areas; (*b*) a communicable disease survey in 32 cities; (*c*) special studies of health and medical facilities in the counties included in the above house-to-house canvasses; (*d*) a special audiometric study of hearing loss in a sample of the surveyed population; and (*e*) transcripts of records of industrial sick benefit organizations.

There follows a list of publications which have resulted from these studies, arranged by broad subject and alphabetically by title for each subject. Copies of these publications may be obtained as indicated in the footnotes.***

The National Health Survey—Scope and method of the Nation-wide canvass of sickness in relation to its social and economic setting. George St. J. Perrott, Clark Tibbitts, and Rollo H. Britten. Pub. Health Rep., **54**: 1663–1687 (1939). Reprint No. 2098.[2]

General Illness Findings:

A disability table for urban workers. Harold F. Dorn.[6]

An estimate of the amount of disabling illness in the country as a whole. National Health Survey preliminary reports, Sickness and Medical Care Series Bull. No. 1, 1938.[1]

Disability from specific causes in relation to economic status. National Health Survey preliminary reports, Sickness and Medical Care Series Bull. No. 9, 1938.[1]

Health of the Negro. Dorothy F. Holland and George St. J. Perrott. Milbank Memorial Fund Quarterly, **16**: 5–38 (January 1938).[5]

Health problems of low income families. George St. J. Perrott. An address before the American Public Welfare Association, Washington, D. C., December 12, 1937. The Health Officer, **2**: 488–495 (1938). (Article also mimeographed.)[1]

Health status of adults in the productive ages. David E. Hailman. Pub. Health Rep., **56**: 2071–2087 (1941). Reprint No. 2327.[2]

Income and Health. George St. J. Perrott. Plan Age, **4**: 34–38 (1938).[4]

Sickness in a metropolitan community—The results of the National Health Survey in New York City. Dorothy F. Holland.[6]

*List as of April 1, 1942.

**Work Projects Administration Official Project Nos. 712159-658/9999 and 765-23-3-10.

***Footnotes:

[1] Obtainable from National Institute of Health, Division of Public Health Methods, Bethesda, Maryland.

[2] Obtainable from U. S. Public Health Service, Bethesda, Md., as long as supply is available (order by number where possible).

[3] The stock for free distribution is exhausted but a copy is obtainable by purchase from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the price given.

[4] Reprints available in a few cases. Application for them should be made to the author.

[5] No copies available for distribution. May be consulted at leading libraries.

[6] In press.

Medical Care:

A study of dental care in Detroit, Mich. Rollo H. Britten. Pub. Health Rep., **53**: 446–459 (1938). Reprint No. 1919.[3] (Reproduced in J. Am. Dent. Assoc. and Dent. Cosmos, **25**: 821–826, 1938.)

Differences in opportunities for health. Joseph W. Mountin and Hazel O'Hara. Pub. Health Rep., **53**: 485–496 (1938). Reprint No. 1920.[3]

Health as an element in social security. George St. J. Perrott and Dorothy F. Holland. Ann. Am. Acad. of Political and Social Science, **202**: 116–136 (1939). Reprint.[1]

Illness and medical care in relation to economic status. National Health Survey preliminary reports, Sickness and Medical Care Series Bull. No. 2, 1938, revised 1939.[1]

Maternal care in Michigan—A progress note. Alexander M. Campbell. J. Mich. State Med. Soc., **37**: 17–21 (1938).[4]

Maternal care in Michigan—A study of obstetric practices. National Health Survey preliminary reports, Sickness and Medical Care Series Bull. No. 8, 1938.[5]

Maternal services in Michigan with special reference to economic status. Jennie C. Goddard and Carroll E. Palmer. Pub. Health Rep., **54**: 825–840 (1939). Reprint No. 2070.[3]

Medical and nursing services for the maternal cases of the National Health Survey. Jennie C. Goddard. Pub. Health Bull. No. 264, 1941.[3]

Medical care as a public health function. Josephine Roche. Am. J. Pub. Health, **27**: 1221–1226 (1937).[4]

Medical needs revealed by the National Health Survey. George St. J. Perrott. Proceedings of the National Conference of Social Work, Sixty-fifth Annual Session (Seattle, Washington, 1938). Reprint.[1]

The National Health Survey—Receipt of medical services in different urban population groups. Rollo H. Britten. Pub. Health Rep., **55**: 2199–2224 (1940). Reprint No. 2213.[3]

Hospital Facilities:

A study of the variations in reports on hospital facilities and their use. Joseph W. Mountin, Elliott H. Pennell, and Emily Hankla. Pub. Health Rep., **53**: 17–25 (1938). Reprint No. 1897.

Business census of hospitals, 1935—General report. Elliott H. Pennell, Joseph W. Mountin, and Kay Pearson. Supplement No. 154 to Pub. Health Rep., 1939.[3]

Existence and use of hospital facilities among the several States in relation to wealth as expressed by per capita income. Elliott H. Pennell, Joseph W. Mountin, and Kay Pearson. Pub. Health Rep., **55**: 822–846 (1940). Reprint No. 2160.[3]

Factors that influence hospital occupancy. Joseph W. Mountin, Elliott H. Pennel, and Kay Pearson. Hospitals, **15**: 18–25 (March 1941).[5]

Financial support of hospitals controlled by State and local governments. Elliott H. Pennell, Joseph W. Mountin, and Kay Pearson. Pub. Health Rep., **56**: 433–445 (1941). Reprint No. 2243.[3]

Hospitals existing singly in counties have similar financial structure. Joseph W. Mountin, Elliott H. Pennell, and Kay Pearson. Pub. Health Rep., **56**: 498–509 (1941). Reprint No. 2246.[3]

Hospital facilities in the United States. Part I. Selected characteristics of hospital facilities in 1936. Joseph W. Mountin, Elliott H. Pennell, and Evelyn Flook. Part II. Trends in hospital development, 1928–1936. Joseph W. Mountin, Elliott H. Pennell, and Kay Pearson. Pub. Health Bull. No. 243, 1938.[1]

Prevailing ratios of personnel to patients in hospitals offering general care. Elliott H. Pennell, Joseph W. Mountin, and Kay Pearson. Hospitals, **12:** 42–47 (November 1938).[1]

Regional differences in hospital facilities for tuberculosis, from the standpoints of accommodations, sources of financial support, and operating costs. Joseph W. Mountin, Elliott H. Pennell, and Kay Pearson. Transactions of the Thirty-fifth Annual Meeting of the National Tuberculosis Association, 1939.[1]

Summary figures on income, expenditures, and personnel of hospitals. Elliott H. Pennell, Joseph W. Mountin, and Emily Hankla. Hospitals, **12:** 11–19 (April 1938).[1]

The distribution of hospitals and their financial support in southern States. Joseph W. Mountin, Elliott H. Pennell, and Kay Pearson. Southern Med. J., **33:** 402–411 (1940).[1]

The financial support of non-Government hospitals as revealed by the recent Federal Business Census of Hospitals. Elliott H. Pennell and Joseph W. Mountin. Hospitals, **11:** 11–19 (December 1937).[1]

Out-Patient Department Facilities:

A count of visits to out-patient departments fails to disclose all ambulatory care by hospitals. Margaret Lovell Plumley. Hospitals, **11:** 97–99 (October 1937).[1]

Admission policies for out-patient departments. Margaret Lovell Plumley. Hospital Management, **45:** 20–22 (February 1938).[1]

General out-patient departments the important element in organized out-patient care. Margaret Lovell Plumley. Hospitals, **11:** 30–32 (September 1937).[1]

How clinic visits are distributed. Margaret Lovell Plumley. The Modern Hospital, **50:** 76–78 (January 1938).[1]

Location and characteristics of 769 out-patient departments. Margaret Lovell Plumley. Hospitals, **11:** 79–85 (December 1937).[1]

Out-patient operating costs. Margaret Lovell Plumley. The Modern Hospital, **49:** 65–67 (December 1937).[1]

Preventive clinic facilities available in 94 selected counties of the United States. Anthony J. Borowski and Margaret Lovell Plumley. Pub. Health Rep., **54:** 335–342 (1939). Reprint No. 2040.[2]

Public Health Agencies:

Dental programs sponsored by health agencies in 94 selected counties. Joseph W. Mountin and Evelyn Flook. Pub. Health Rep., **54:** 1625–1636 (1939). Reprint No. 2096.[2]

How expenditures for selected public health services are apportioned. Joseph W. Mountin. Pub. Health Rep., **52:** 1384–1389 (1937). Reprint No. 1865.[2]

Organized public nursing and variation of field programs in 94 selected counties. Joseph W. Mountin and Evelyn Flook. Pub. Health Rep., **54:** 815–825 (1939). Reprint No. 2069.[2]

Positions and rates of pay in public health agencies. Anthony J. Borowski. Am. J. Pub. Health, **28:** 1197–1202 (1938).[1]

Variations in the form and services of public health organizations. Joseph W. Mountin, Anthony J. Borowski, and Hazel O'Hara. Pub. Health Rep., **53:** 523–536 (1938). Reprint No. 1923.[2]

Occupational Morbidity and Mortality:

Disabling morbidity among employees in the slaughter and meat packing industry, 1930–34, inclusive. H. P. Brinton, H. E. Seifert, and Elizabeth S. Frasier. Pub. Health Rep., **54**: 2196–2219 (1939). Reprint No. 2119. 5 cents per copy.[3]

Disabling morbidity among employees in the soap industry, 1930–34, inclusive. H. P. Brinton and H. E. Seifert. Pub. Health Rep., **54**: 1301–1316 (1939). Reprint No. 2093.[2]

Disabling morbidity among male and female employees in mail order stores, 1930–34, inclusive. H. P. Brinton and Elizabeth S. Frasier. Pub. Health Rep., **55**: 1163–1178 (1940). Reprint No. 2174.[2]

Disabling morbidity, and mortality among white and Negro male employees in the slaughter and meat packing industry, 1930–34, inclusive. H. P. Brinton. Pub. Health Rep., **54**: 1965–1977 (1939). Reprint No. 2111. 5 cents per copy.[3]

Disabling sickness among industrial workers with particular reference to time changes in duration. W. M. Gafafer. Am. J. Pub. Health, **31**: 443–451 (1941).[1]

Disabling sickness and nonindustrial injuries among drivers and other employees of certain bus and cab companies, 1930–34, inclusive. H. P. Brinton. Pub. Health Rep., **54**: 459–468 (1939). Reprint No. 2049.[2]

Disabling sickness among 2,000 white male glass workers. W. M. Gafafer. Pub. Health Rep., **56**: 1791–1799 (1941). Reprint No. 2312.[2]

Frequency of sickness and nonindustrial accidents causing disability lasting eight calendar days or longer among 60,000 white male railroad employees, 1930–34, inclusive. W. M. Gafafer. Pub. Health Rep., **53**: 555–573 (1938). Reprint No. 1924.[2]

General aspects and functions of the sick benefit organization. R. R. Sayers, Gertrud Kroeger, and W. M. Gafafer. Pub. Health Rep., **52**: 1563–1580 (1937). Reprint No. 1874.[2]

Occupational and environmental analysis of the cement, clay, and pottery industries. R. R. Sayers, J. M. DallaValle, and S. G. Bloomfield. Pub. Health Bull. No. 238, 1937. 10 cents per copy.[3]

Regional variation in disabling sickness among a group of Negro male railroad employees. H. P. Brinton. Social Forces, **20**: 264–270 (1941).[1]

The coding of occupations for machine tabulating purposes with reference principally to studies on occupational morbidity. H. E. Seifert. J. Ind. Hyg. and Toxicol., **21**: 246–255 (1939).[1]

Chronic Disease:

Chronic disease and gross impairments in a northern industrial community. George St. J. Perrott and Dorothy F. Holland. J. Am. Med. Assoc., **108**: 1876–1886 (1937).[4]

Chronic illness in New York City—A report by its citizens. George St. J. Perrott. An address before the New York City Welfare Council, May 5, 1938. (Mimeographed.)[5]

The magnitude of the chronic disease problem in the United States. National Health Survey preliminary reports, Sickness and Medical Care Series Bull. No. 6, 1938.[1]

Accidents:

Accidents as a cause of disability. National Health Survey preliminary reports. Sickness and Medical Care Series Bull. No. 3, 1938.[1]

Accidents in the urban home as recorded in the National Health Survey. Rollo H. Britten, Joan Klebba, and David E. Hailman. Pub. Health Rep., **55**: 2061–2086 (1940). Reprint No. 2207.[2]

Industrial injuries among the urban population as recorded in the National Health Survey. Joan Klebba. Pub. Health Rep., **56**: 2375–2392 (1941). Reprint No. 2339.[2]

Public accidents among the urban population as recorded in the National Health Survey. Joan Klebba and Rollo H. Britten. Pub. Health Rep., **56**: 1419–1439 (1941). Reprint No. 2294.[2]

Impaired Hearing:

Characteristics and distribution of impaired hearing in the population of the United States. Willis C. Beasley. J. Acoustical Soc. of America, **12**: 114–121 (1940). Reprint.[1]

Correlation between hearing loss measurements by air conduction on eight tones. Willis C. Beasley. J. Acoustical Soc. of America, **12**: 104–113 (1940). Reprint.[1]

Generalized age and sex trends in hearing loss. National Health Survey preliminary reports, Hearing Study Series Bull. No. 7, 1938.[5]

Normal hearing by air and bone conduction. National Health Survey preliminary reports, Hearing Study Series Bull. No. 4, 1938.[5]

Normal hearing for speech at each decade of life. National Health Survey preliminary reports, Hearing Study Series Bull. No. 5, 1938.[5]

Partial deafness and hearing-aid design. I. Characteristics of hearing loss in various types of deafness. Willis C. Beasley. J. Soc. Motion Picture Engineers, **35**: 59–85 (July 1940). Reprint.[1]

Preliminary analysis of audiometric data in relation to clinical history of impaired hearing. National Health Survey preliminary reports, Hearing Study Series Bull. No. 2, 1938.[5]

Prevalence of aural pathology and clinical history of impaired hearing among males and females of various ages. National Health Survey preliminary reports, Hearing Study Series Bull. No. 3, 1938.[5]

Sex differences and age variations in hearing loss in relation to stage of deafness. National Health Survey preliminary reports, Hearing Study Series Bull. No. 6, 1938.[1]

Significance, scope, and method of a clinical investigation of hearing in the general population. National Health Survey preliminary reports, Hearing Study Series Bull. No. 1, 1938.[5]

The general problem of deafness in the population. Willis C. Beasley. Laryngoscope, **50**: 856–905 (1940). Reprint.[1]

Other Specific Diagnosis Groups:

Blindness—Amount, causes, and relation to certain social factors. National Health Survey preliminary reports, Sickness and Medical Care Series Bull. No. 10, 1938.[5]

Blindness, as recorded in the National Health Survey—Amount, causes, and relation to certain social factors. Rollo H. Britten. Pub. Health Rep., **56**: 2191–2215 (1941). Reprint No. 2332.[2]

Pneumonia in urban United States: Frequency, severity, and medical care. National Health Survey preliminary reports, Sickness and Medical Care Series Bull. No. 11, 1938.[5]

Some findings concerning the incidence of tuberculosis among persons closely related to the first person in a family to contract the disease. Joan Klebba.[6]

The incidence of pneumonia as recorded in the National Health Survey. Rollo H. Britten.[6]

The occurrence of hay fever and asthma as recorded in the National Health Survey. Rollo H. Britten and David E. Hailman.[6]

The prevalence and causes of orthopedic impairments. National Health Survey preliminary reports, Sickness and Medical Care Series Bull. No. 4, 1938.[5]

Illness and Medical Care in Childhood:

The disabling diseases of childhood—Their characteristics and medical care as observed in 500,000 children in eighty-three cities canvassed in the National Health Survey of 1935–1936. Dorothy F. Holland. Am. J. of Dis. Children, **58**: 1157–1185 (1939). Reprint.[1]

The disabling diseases of childhood—Their characteristics and medical care as observed in 500,000 children in 83 cities canvassed in the National Health Survey, 1935–1936:

I. Characteristics and leading causes. Dorothy F. Holland. Pub. Health Rep., **55**: 135–136 (1940). Reprint No. 2134. 5 cents per copy.[3]

II. Medical and nursing care. Dorothy F. Holland. Pub. Health Rep., **55**: 227–244 (1940). Reprint No. 2137. 5 cents per copy.[3]

The occurrence of whooping cough, chickenpox, mumps, measles, and German measles in 200,000 surveyed families in 28 large cities. Selwyn D. Collins, Ralph E. Wheeler, and Robert D. Shannon.[6]

The relationship of maternal and child health to the general health program. Thomas Parran. An address before the Children's Bureau Conference on Better Care for Mothers and Babies, January 17, 1938, Washington, D. C. (Mimeographed.)

Unemployment and Illness:

Illness among employed and unemployed workers. National Health Survey preliminary reports, Sickness and Medical Care Series Bull. No. 7, 1938.[5]

Illness and medical care among the unemployed. Statement by Thomas Parran, and detailed report submitted to the Special Senate Committee to Investigate Unemployment and Relief, March 16, 1938. United States Senate (Hearings pursuant to S. Res. 36).[5]

Housing:

Adequacy of urban housing in the United States as measured by degree of crowding and type of sanitary facilities. National Health Survey preliminary reports, Sickness and Medical Care Series Bull. No. 5, 1938.[1]

An analysis of sanitary facilities in the United States. J. M. DallaValle and Rollo H. Britten.[6]

Certain characteristics of urban housing and their relation to illness and accidents: Summary of findings of the National Health Survey. Rollo H. Britten, J. E. Brown, and Isidore Altman. Milbank Memorial Fund Quarterly, **18**: 91–113 (1940). Reprint.[1] (Also reproduced in "Housing for Health," The Science Press Printing Co., Lancaster, Pa., 1941.)

Effects of crowded housing upon health. Rollo H. Britten. Labor Information Bull., **8**: 5–6 (July 1941).[4]

Housing and health. Rollo H. Britten. Am. J. Pub. Health, **28**: 957–960 (1938).[5]

Illness and accidents among persons living under different housing conditions: Data based on the National Health Survey. Rollo H. Britten and Isidore Altman. Pub. Health Rep., **56**: 609–640 (1941). Reprint No. 2253.[3]

New light on the relation of housing to health. Rollo H. Britten. Am. J. Pub. Health, **32**: 193–199 (1942).[1]

Urban housing conditions in the United States. Rollo H. Britten. Labor Information Bulletin, **5**: 1–3 (June 1938).[4]

Urban housing and crowding—Relation to certain population characteristics as indicated by National Health Survey data. Rollo H. Britten and J. E. Brown. Pub. Health Bull. No. 261, 1941. 15 cents per copy.[3]

Fertility:

Birth rates and socio-economic attributes in 1935. Clyde V. Kiser. Milbank Memorial Fund Quarterly, **17**: 128–151 (1939).[4]

Group differences in urban fertility—A study derived from the National Health Survey. Clyde V. Kiser.[6]

Intragroup differences in birth rates of married women. Clyde V. Kiser. Milbank Memorial Fund Quarterly, **19**: 147–170 (1941).[4]

The differential fertility and potential rates of growth of various income and educational classes of urban populations in the United States. Bernard D. Karpinos and Clyde V. Kiser. Milbank Memorial Fund Quarterly, **17**: 367–391 (1939).[4]

Variations in birth rates according to occupational status, family income, and educational attainment. Clyde V. Kiser. Milbank Memorial Fund Quarterly, **16**: 39–56 (1938).[4]

Family Composition:

Children and income in urban single-family households. Barkev S. Sanders. Social Security Bull., **2**: 3–10 (November 1939).[4]

Children in urban and rural families. Barkev S. Sanders and Doris Carlton. Social Security Bull., **2**: 36–46 (October 1939).[4]

Economic status of the aged in urban households. Barkev S. Sanders. Social Security Bull., **3**: 13–21 (October 1940).[4]

Family composition in the United States. Barkev S. Sanders. Social Security Bull., **2**: 9–13 (April 1939).[4]

Gainful workers and income in urban single-family households. Barkev S. Sanders. Social Security Bull., **2**: 29–36 (December 1939).[4]

Income, children, and gainful workers in urban multifamily households. Barkev S. Sanders, Anne G. Kantor, and Doris Carlton. Social Security Bull., **3**: 17–28 (April 1940).[4]

Income, children, and gainful workers in urban single-family households. Barkev S. Sanders and Anne G. Kantor. Social Security Bull., **3**: 21–30 (February 1940).[4]

Income of urban families and individuals in single-family households. Barkev S. Sanders and Anne G. Kantor. Social Security Bull., **2**: 25–36 (September 1939).[4]

Marital and parental status according to age. Robert J. Myers and Eugene A. Rasor. Social Security Bull., **4**: 8–11 (November 1941).[4]

Social characteristics and employment status of urban workers. Anne G. Kantor, Doris Carlton, and Barkev S. Sanders. Social Security Bull., **4**: 26–36 (February 1941).[4]

Statistics of family composition in selected areas of the United States, 1934–36. Vol. 1, Detroit, Michigan; Vol. 2, Boston, Massachusetts; Vol. 3, Buffalo, New York; Vol. 4, Chicago, Illinois; Vol. 5, New York, New York; Vol. 6, Philadelphia, Pennsylvania; Vol. 7, Cleveland, Ohio. Bureau of Research and Statistics, Social Security Board, Bureau Memorandum No. 45. 1941–42. (Application for copies should be made to the Bureau of Research and Statistics, Social Security Board, Washington, D. C.)

The economic status of urban families and children. I. S. Falk and Barkev S. Sanders. Social Security Bull., **2**: 25–34 (May 1939).[4]

Other Population Subjects:

Characteristics of the urban unemployed. National Health Survey preliminary reports, Population Series Bull. D, 1938.[5]

Color, sex, and age of the population enumerated. National Health Survey preliminary reports, Population Series Bull. E, 1938.[5]

Educational attainment of urban youth in various income classes. Bernard D. Karpinos and Herbert J. Sommers. Elementary School J., May and June 1942.[1]

Families classified by occupational class of the head. National Health Survey preliminary reports, Population Series Bull. B, 1938.[5]

Families distributed by income during the survey year. National Health Survey preliminary reports, Population Series Bull. A, 1938.[5]

Population trends and problems of public health. George St. J. Perrott and Dorothy F. Holland. Milbank Memorial Fund Quarterly, **18**: 359–392 (1940). Reprint.[1]

School attendance as affected by prevailing socio-economic factors. Bernard D. Karpinos.[6]

The collection and use of family income data in the National Health Survey. Clark Tibbits and Howard R. Ogburn. National Bureau of Economic Research.[6]

The relief and income status of the urban population of the United States, 1935. National Health Survey preliminary reports, Population Series Bull. C, 1938.[1]

The socio-economic and employment status of urban youth in the United States, 1935–36. Bernard D. Karpinos. Pub. Health Bull. No. 273, 1941.[3]

Miscellaneous:

Comparison of occupational class and physicians' estimate of economic status. Jennie C. Goddard. Pub. Health Rep., **54**: 2159–2165 (1939). Reprint No. 2115.[3]

Milk consumption in Buffalo. Archibald S. Dean and William M. Haenszel. Supplement to Statistical Survey, The University of Buffalo Bureau of Business and Social Research, **13**: 1–11 (March 1938).[4]

Selection, training, and performance of the National Health Survey field staff. C. C. Lienau. Am. J. Hyg., **34** (Sec. A): 110–132 (November 1941).[4]

What do we know about health in a depression? Clark Tibbitts. Read before Detroit Regional Conference of Social Work, May 6, 1938. (Mimeographed—not available for distribution.)

INCIDENCE OF HOSPITALIZATION, APRIL 1942

[Reported for nonprofit Blue Cross Hospital Service Plans by the Hospital Service Plan Commission of the American Hospital Association]

The following table inaugurates a new current index of illness. Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 8,000,000 members of Blue Cross Hospital Service Plans will be presented monthly. These plans provide prepaid hospital service and it is believed that the admission rate per 1,000 will reflect rather accurately the prevalence of serious illness among the members. The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	April	
	1942	1941
1. Number of plans supplying data	60	45
2. Number of persons eligible for hospital care	7,932,108	4,992,468
3. Number of persons admitted for hospital care	70,444	44,007
4. Incidence per 1,000 persons, annual rate, during current month (daily rate × 365)	107 9	107.2
5. Simple average of annual rates for the 12 months ended April 30	107 0	------------

DEATHS DURING WEEK ENDED MAY 16, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended May 16, 1942	Corresponding week, 1941
Data from 87 large cities of the United States.		
Total deaths	8,187	8,047
Average for 3 prior years	8,128	------------
Total deaths, first 19 weeks of year	169,522	172,697
Deaths per 1,000 population, first 19 weeks of year, annual rate	12 5	12 7
Deaths under 1 year of age	531	519
Average for 3 prior years	488	------------
Deaths under 1 year of age, first 19 weeks of year	10,757	10,006
Data from industrial insurance companies:		
Policies in force	64,979,848	64,507,375
Number of death claims	11,054	10,882
Death claims per 1,000 policies in force, annual rate	8.9	8 8
Death claims per 1,000 policies, first 19 weeks of year, annual rate	10.1	10.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED MAY 23, 1942

Summary

The incidence of meningococcus meningitis declined during the week from 86 to 81 cases, but remains higher than for any other year since 1937. Most of the cases, approximately 83 percent, were reported in the New England (11), Atlantic (45), and Pacific (11) areas, with New York (20), Massachusetts (7), Maryland (7), New Jersey (6), Virginia (6), and Washington State (6) reporting the largest numbers.

Measles continues above the 5-year (1937–41) median, and the number of influenza cases for the current week was above the median expectancy, with slightly more than one-fourth of the cases being reported from Texas. An increase in the number of cases of poliomyelitis was reported, with 26 cases, as compared with 14 cases for the preceding week. Not more than 3 cases were reported in any one State.

The incidence of diphtheria, scarlet fever, smallpox and typhoid fever remained below that for any earlier year of record.

Other reports for the current week include 3 cases of anthrax (in Pennsylvania), 162 cases of bacillary, 25 cases of amebic, and 88 cases of unspecified dysentery, 2 cases of leprosy (1 in Louisiana and 1 in California), 14 cases of Rocky Mountain spotted fever (6 in the Eastern States and 8 in the Mountain States), 36 cases of tularemia, and 35 cases of endemic typhus fever (13 in Georgia and 10 in Texas). Seven cases of encephalitis (unspecified) were reported in New Mexico. Several cases of infectious encephalitis and equine encephalomyelitis were reported in the State last fall, but up to the current week only 1 case of infectious and 6 cases of the unspecified form of the disease had been reported during the current year.

The death rate for 88 large cities in the United States for the current week is 11.3 per 1,000 population, as compared with 11.5 for the preceding week and a 3-year (1939–41) average of 11.5. The cumulative rate to date (first 20 weeks of the year) is 12.4 as compared with 12.7 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended May 23, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis meningococcus		
	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41
	May 23, 1942	May 24, 1941		May 23, 1942	May 24, 1941		May 23, 1942	May 24, 1941		May 23, 1942	May 24, 1941	
NEW ENG.												
Maine	0	0	1	------	------	------	69	97	103	1	0	0
New Hampshire	0	0	0	------	------	------	45	31	31	1	1	0
Vermont	1	1	1	------	------	------	235	88	83	0	0	0
Massachusetts	5	0	3	------	------	------	1,219	958	869	7	1	1
Rhode Island	0	0	0	------	------	------	216	2	80	0	0	0
Connecticut	0	0	2	1	------	3	492	397	189	2	1	1
MID. ATL.												
New York	15	19	25	[1] 5	[1] 3	[1] 7	856	3,596	2,251	20	7	7
New Jersey	4	7	7	2	2	4	819	2,324	990	6	2	0
Pennsylvania	6	6	22	------	------	------	1,591	5,887	1,728	2	9	5
E. NO. CEN.												
Ohio	7	12	9	5	13	7	469	2,994	586	3	3	1
Indiana	2	5	7	------	21	12	58	1,200	462	0	2	2
Illinois	17	13	22	2	22	17	319	1,459	346	0	1	1
Michigan [2]	5	3	8	------	4	2	207	2,232	564	0	3	0
Wisconsin	0	4	4	26	24	48	1,383	1,644	1,162	0	0	1
W. NO. CEN.												
Minnesota	1	8	2	------	2	1	838	21	140	0	1	0
Iowa	3	2	4	------	10	------	278	140	152	1	2	0
Missouri	7	5	5	------	4	6	247	587	48	1	0	0
North Dakota	2	0	0	------	------	3	67	107	56	0	0	0
South Dakota	1	1	0	------	------	------	21	37	5	0	0	0
Nebraska	1	0	1	10	------	------	264	37	37	0	0	0
Kansas	1	3	4	3	7	3	378	557	392	1	2	1
SO. ATL.												
Delaware	1	0	1	------	------	------	10	85	14	0	0	0
Maryland [2]	8	4	4	2	1	3	369	401	318	7	3	1
Dist. of Col.	2	0	2	1	1	------	97	248	107	2	0	0
Virginia	4	9	6	106	59	57	155	1,343	502	6	2	2
West Virginia	3	3	4	13	------	20	51	502	78	0	0	2
North Carolina	4	6	6	8	3	3	352	1,597	472	1	3	1
South Carolina	11	5	5	188	138	138	213	272	11	0	1	1
Georgia	3	2	4	8	14	14	90	360	132	1	0	0
Florida	1	0	1	------	20	3	93	475	97	0	0	0
E. SO. CEN.												
Kentucky	2	5	6	2	------	8	75	962	158	0	0	1
Tennessee	1	7	4	15	21	24	150	341	133	2	0	0
Alabama	6	7	7	119	21	34	96	269	176	2	0	0
Mississippi [2]	3	1	2	------	------	------	------	------	------	1	1	1
W. SO. CEN.												
Arkansas	2	2	2	39	258	26	121	317	142	0	0	0
Louisiana	5	0	5	4	1	6	114	27	27	2	2	1
Oklahoma	3	7	5	31	19	34	180	152	152	0	0	0
Texas	21	17	23	302	389	298	733	900	900	1	8	3
MOUNTAIN												
Montana	0	1	1	2	2	9	113	63	63	0	0	0
Idaho	0	0	0	------	------	------	120	6	25	0	0	0
Wyoming	0	6	0	44	------	------	52	277	26	0	0	0
Colorado	5	8	8	42	20	2	248	542	237	0	0	0
New Mexico	0	2	1	------	------	1	41	106	87	0	0	0
Arizona	0	3	1	74	58	47	158	110	46	0	0	0
Utah [2]	0	5	0	8	7	------	1,104	42	151	0	0	0
Nevada	0	0	------	------	------	------	44	0	------	0	0	------
PACIFIC												
Washington	2	1	0	3	2	------	657	15	55	6	0	0
Oregon	1	2	3	6	2	17	100	140	78	1	0	0
California	18	11	26	53	222	44	5,359	734	734	4	1	2
Total	184	203	283	1,124	1,379	876	20,966	34,681	15,205	81	56	50
20 weeks	5,439	5,348	8,751	74,496	478,389	154,422	372,732	689,526	273,815	1,567	998	998

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended May 23, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	May 23, 1942	May 24, 1941		May 23, 1942	May 24, 1941		May 23, 1942	May 24, 1941		May 23, 1942	May 24, 1941	
NEW ENG.												
Maine	0	0	0	16	13	13	0	0	0	0	0	0
New Hampshire	0	0	0	4	0	4	0	0	0	0	0	0
Vermont	0	0	0	15	0	5	0	0	0	0	0	0
Massachusetts	1	0	0	256	197	197	0	0	0	2	1	1
Rhode Island	0	0	0	19	7	7	0	0	0	0	1	1
Connecticut	0	0	0	23	58	75	0	0	0	0	2	1
MID. ATL.												
New York	1	1	1	309	546	714	0	0	0	5	17	5
New Jersey	2	2	0	117	278	229	0	0	0	2	1	1
Pennsylvania	0	0	0	324	384	401	0	0	0	4	6	6
E. NO. CEN.												
Ohio	1	0	0	223	260	213	0	1	1	7	3	5
Indiana	0	1	0	43	87	115	0	0	19	4	2	8
Illinois	1	1	1	145	269	402	0	3	16	1	5	5
Michigan [3]	1	0	2	220	267	384	1	6	6	3	0	8
Wisconsin	0	0	0	98	100	139	3	2	3	0	0	0
W. NO. CEN.												
Minnesota	0	1	0	62	40	76	0	0	8	2	0	0
Iowa	0	0	0	37	26	78	0	4	20	1	2	1
Missouri	1	0	0	48	99	99	0	4	20	0	1	1
North Dakota	0	0	0	6	2	17	0	0	2	0	0	1
South Dakota	0	0	0	22	5	11	0	4	4	0	0	0
Nebraska	0	0	0	11	9	24	0	0	4	2	0	0
Kansas	2	0	0	47	20	60	0	0	4	0	4	1
SO. ATL.												
Delaware	0	0	0	18	19	6	0	0	0	0	0	0
Maryland [3]	0	0	0	71	39	39	0	0	0	1	3	2
Dist. of Col.	1	0	0	12	14	14	0	0	0	0	0	0
Virginia	1	0	0	11	15	17	0	0	0	4	3	5
West Virginia	0	0	0	21	50	35	0	0	0	1	5	4
North Carolina	1	1	0	13	12	12	1	0	0	1	2	4
South Carolina	3	0	0	0	5	3	2	0	0	5	3	3
Georgia	1	0	0	6	13	13	1	0	0	5	13	10
Florida	1	10	1	0	2	4	0	0	0	4	1	3
E. SO. CEN.												
Kentucky	1	0	0	48	85	47	0	0	1	0	5	5
Tennessee	1	0	0	28	51	51	0	3	3	0	8	7
Alabama	0	1	1	10	19	6	0	0	0	2	0	2
Mississippi [3]	1	2	0	2	1	4	0	1	1	1	0	2
W. SO. CEN.												
Arkansas	3	0	0	0	2	5	0	1	1	1	3	2
Louisiana	0	0	1	9	4	7	3	0	0	13	4	14
Oklahoma	0	0	0	10	13	14	0	1	4	2	7	5
Texas	0	1	1	18	21	32	5	0	4	11	13	9
MOUNTAIN												
Montana	0	0	0	9	6	12	0	0	0	0	0	1
Idaho	0	0	0	2	4	5	0	2	2	0	0	0
Wyoming	0	0	0	11	0	2	0	0	0	0	0	0
Colorado	0	0	0	15	18	30	0	0	3	1	0	1
New Mexico	1	0	0	1	5	7	0	0	1	2	0	0
Arizona	0	0	0	8	6	10	0	0	1	2	0	1
Utah [3]	0	0	0	8	13	15	0	1	0	0	0	0
Nevada	0	0	------	0	0	------	0	0	------	0	0	------
PACIFIC												
Washington	0	0	0	23	17	37	1	6	1	1	0	0
Oregon	0	1	1	6	5	18	1	1	7	0	4	3
California	1	5	2	95	108	164	0	0	12	3	1	6
Total	26	27	27	2,500	3,218	4,272	18	34	237	93	120	146
20 weeks	417	444	412	74,581	74,083	97,895	437	916	6,239	1,600	1,626	2,265

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended May 23, 1942—Con.

Division and State	Whooping cough, Week ended— May 23, 1942	Whooping cough, Week ended— May 24, 1941	Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
			Week ended May 23, 1942								
NEW ENG.											
Maine	21	19									
New Hampshire	1	16									
Vermont	23	13									
Massachusetts	193	357			1		3				
Rhode Island	47	23									
Connecticut	74	66			2						
MID. ATL.											
New York	441	270		3	3		2			1	
New Jersey	369	194							1		
Pennsylvania	231	435	3	2			1		2		
E NO CEN.											
Ohio	201	370					2				
Indiana	30	32									
Illinois	255	106								1	
Michigan [2]	233	379									
Wisconsin	184	111									
W. NO. CEN											
Minnesota	41	90		2							
Iowa	20	28								3	
Missouri	12	65								2	
North Dakota	10	20					2				
South Dakota	1	16									
Nebraska	6	6									
Kansas	42	130					1				
SO. ATL.											
Delaware	2	0									
Maryland [2]	65	146				6					
Dist of Col	9	10									
Virginia	96	83				22			1		
West Virginia	12	29									
North Carolina	94	345							1	1	1
South Carolina	117	89									
Georgia	43	47		1	6					4	13
Florida	13	24									3
E. SO. CEN.											
Kentucky	72	40							1	1	
Tennessee	33	65		2		1				1	
Alabama	61	68									6
Mississippi [2]											
W. SO. CEN.											
Arkansas	13	70		3	5					5	
Louisiana	36	5		2	2			1		2	2
Oklahoma	15	26									
Texas	118	374		6	141					1	10
MOUNTAIN											
Montana	13	4							1	4	
Idaho	5	6							1	1	
Wyoming	10	3							4	1	
Colorado	23	205							2		
New Mexico	23	40					(3)				
Arizona	13	35				59	1				
Utah [2]	21	34								6	
Nevada	0	0									
PACIFIC											
Washington	58	108			1						
Oregon	10	34									
California	357	811		4	1			1		2	
Total	3,767	5,447	3	25	162	88	12	2	14	36	35
20 weeks	76,786	93,426									

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Seven cases Unspecified Encephalitis reported.

WEEKLY REPORTS FROM CITIES

City reports for week ended May 9, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	4	0	6	0	7	0	3	0	1	1
Baltimore, Md	3	0	2	2	333	4	9	0	21	0	2	30
Barre, Vt	0	0	-	0	0	0	0	0	0	0	0	10
Billings, Mont	0	0	-	0	6	0	0	0	1	0	0	2
Birmingham, Ala	0	0	4	0	2	1	0	1	2	0	1	8
Boston, Mass	0	0	-	0	327	1	9	0	82	0	0	63
Bridgeport, Conn	0	0	-	0	20	1	4	0	8	0	1	2
Brunswick, Ga	0	0	-	0	18	0	1	0	0	0	0	2
Buffalo, N. Y	0	0	-	0	12	0	12	0	27	0	0	0
Camden, N J	2	0	-	0	3	0	3	0	12	0	0	1
Charleston, S C	0	0	11	0	6	0	0	1	0	0	1	6
Charleston, W. Va	0	0	-	0	0	0	0	0	0	0	0	0
Chicago, Ill	4	0	1	1	46	0	25	1	53	0	0	108
Cincinnati, Ohio	1	0	-	1	8	0	3	1	30	0	0	12
Cleveland, Ohio	2	0	2	1	7	0	9	1	56	0	1	35
Columbus, Ohio	0	0	1	1	46	0	4	0	5	0	0	9
Concord, N H	0	0	-	0	0	0	0	0	0	0	0	0
Cumberland, Md	0	0	-	0	1		0	0	0	0	0	0
Dallas, Tex	2	0	-	0	45	0	0	0	2	0	1	7
Denver, Colo	2	0	12	1	101	0	1	0	6	0	0	3
Detroit, Mich	3	0	-	0	30	2	8	0	113	0	0	56
Duluth, Minn	0	0	-	0	4	0	1	0	8	0	0	0
Fall River, Mass	1	0	-	0	40	0	1	0	30	0	0	0
Fargo, N Dak	0	0	-	0	1	0	0	0	1	0	0	3
Flint, Mich	0	0	-	0	1	0	0	0	2	0	0	3
Fort Wayne, Ind	0	0	-	0	1	0	2	0	0	0	0	2
Frederick, Md	0	0	-	0	-	0	0	0	0	0	0	0
Galveston, Tex	0	0	-	0	13	1	2	0	0	0	0	4
Grand Rapids, Mich	0	0	-	0	2	0	1	0	2	0	0	4
Great Falls, Mont	0	0	-	0	23	0	1	0	0	0	0	4
Hartford, Conn	0	0	-	0	93	0	0	0	4	0	0	13
Helena, Mon	0	0	-	0	1	0	0	0	0	0	0	1
Houston, Tex	1	0	-	0	33	0	12	0	0	0	0	0
Indianapolis, Ind	0	0	-	0	151	0	7	0	18	0	0	20
Kansas City, Mo	0	0	-	0	124	0	5	0	22	0	0	0
Kenosha, Wis	0	0	-	0	8	0	0	0	1	0	0	9
Little Rock, Ark	0	0	-	0	0	1	1	0	0	0	0	0
Los Angeles, Calif	3	0	13	0	573	0	4	1	16	0	0	22
Lynchburg, Va	0	0	-	0	0	0	1	0	0	0	0	34
Memphis, Tenn	0	0	2	1	37	0	5	0	4	0	0	18
Milwaukee, Wis	0	0	-	0	185	0	4	0	27	0	0	85
Minneapolis, Minn	0	0	-	0	483	0	5	0	11	0	1	7
Missoula, Mont	0	0	-	0	29	0	1	0	3	0	0	0
Mobile, Ala	0	0	1	3	0	0	3	0	1	0	0	0
Nashville, Tenn	0	0	-	0	5	0	3	0	0	0	0	1
Newark, N. J	0	0	2	0	306	4	6	0	21	0	0	41
New Haven, Conn	0	0	-	0	97	0	0	0	1	0	0	3
New Orleans, La	0	0	-	0	0	1	6	0	3	0	1	0
New York, N. Y	14	2	8	1	104	15	55	1	220	0	2	222
Omaha, Nebr	3	0	-	0	175	0	3	0	3	0	0	0
Philadelphia, Pa	1	0	2	2	60	0	21	0	180	0	1	95
Pittsburgh, Pa	2	0	-	0	13	0	12	0	14	0	0	12
Portland, Maine	0	0	-	0	10	2	4	0	0	0	0	1
Providence, R. I	0	0	-	0	174	3	1	0	6	0	0	12
Pueblo, Colo	0	0	-	0	0	0	1	0	2	0	0	0
Racine, Wis	0	0	-	0	308	0	0	0	1	0	0	34
Raleigh, N. C	0	0	-	0	3	0	1	0	0	0	0	0
Reading, Pa	0	0	-	0	8	0	1	0	0	0	0	6
Richmond, Va	1	0	1	1	8	1	1	0	2	0	1	6

City reports for week ended May 9, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Roanoke, Va	0	0		0	2	0	0	0	0	0	0	0
Rochester N Y	0	0		0	18	1	1	0	8	0	0	4
Sacramento Calif	0	0		0	57	0	2	0	3	0	0	23
Saint Joseph Mo	0	0		0	8	0	3	0	0	0	0	0
Saint Louis Mo	1	0		0	142	0	12	0	15	0	0	4
Saint Paul Minn	0	0		0	181	0	5	0	7	0	0	12
Salt Lake City, Utah	0	0		0	184	0	2	0	0	0	0	5
San Antonio, Tex	0	0		0	17	0	4	2	0	0	0	2
San Francisco, Calif	0	0	2	1	273	1	4	0	14	0	0	10
Savannah, Ga	0	0	3	0	1	0	2	0	0	0	0	1
Seattle, Wash	0	0		1	110	0	2	0	1	0	0	25
Shreveport La	1	0		0	10	0	3	0	0	0	0	1
South Bend, Ind	0	0		0	0	0	2	0	5	0	0	5
Spokane, Wash	0	0		0	50	1	2	0	3	0	0	4
Springfield, Ill	0	0		0	89	0	2	0	6	0	0	0
Springfield Mass	0	0	1	0	76	0	6	0	15	0	0	6
Superior, Wis	0	0		0	2	0	0	0	1	0	0	0
Syracuse, N Y	0	0		0	227	0	0	0	1	0	1	46
Tacoma, Wash	0	0		0	5	0	1	0	6	0	0	1
Tampa, Fla	0	0	2	0	57	0	0	0	0	0	1	0
Terre Haute, Ind	0	0		0	2	0	0	0	0	0	0	0
Topeka Kans	0	0		0	40	0	2	0	1	0	0	1
Trenton, N J	0	0		0	1	0	0	0	8	0	0	4
Washington D C	1	0		0	121	3	8	0	5	0	0	12
Wheeling W Va	0	0		0	3	0	0	0	0	0	0	0
Wichita, Kans	0	0		0	105	0	4	0	1	0	0	1
Wilmington Del	0	0		0	5	0	1	0	5	0	0	0
Wilmington N C	0	0		1	10	0	0	0	0	0	0	3
Winston-Salem N C	0	0		0	9	0	1	0	1	0	0	0
Worcester Mass	0	0		0	2	0	8	0	11	0	0	70

Dysentery, Amebic—Cases Boston 1 Dallas 1 Detroit, 2, St Louis, 1, San Francisco 1 Washington, D C 1

Dysentery, Bacillary—Cases Los Angeles 1 New York, 2

Typhus fever—Cases San Antonio, 1, Tampa, 1

Rates (annual basis) per 100,000 population, for the group of 89 cities in the preceding table (estimated population, 1942, 34,064,655)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended May 9 1942	7 35	11 33	2 76	902 66	52 50	174 65	0 00	2 45	191 49
Average for week, 1937-41	14 68	17 30	5 56	[1]1732 50	73 70	277 18	2 16	3 24	196 53

[1] Median

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended April 25, 1942.—During the week ended April 25, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta [1]	British Columbia	Total
Cerebrospinal meningitis		6	2	6	6		1		2	23
Chickenpox		4	1	130	255	32	33		180	635
Diphtheria		28	5	9	2	3				47
Dysentery				3						3
German measles		6	3	26	50	11	5		36	137
Influenza		28							13	41
Measles		7	2	475	155	152	14		25	830
Mumps	2	28	4	332	462	104	149		547	1,628
Pneumonia		12			7	2	1		26	48
Poliomyelitis			2	1		1	1			5
Scarlet fever	2	38	24	119	221	43	20		40	507
Trachoma						1			1	2
Tuberculosis	2	7	4	73	57				21	164
Typhoid and paratyphoid fever				25	4					29
Undulant fever				1						1
Whooping cough		7	4	235	107	1	1		54	409
Other communicable diseases		6		3	192	51	1		6	259

[1] No report was received from Alberta for this period.

FINLAND

Communicable diseases—February 1942—During the month of February 1942, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	183	Poliomyelitis	5
Influenza	2,129	Scarlet fever	475
Paratyphoid fever	67	Typhoid fever	42

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January-February 1942	March 1942	April 1942—week ended— 4	11	18	25
ASIA							
Ceylon	C		31	1			
India	C	8,185	6,369				
Calcutta	C	109	72	67			
Chittagong	C	1	29	4			
Rangoon	C	1					

PLAGUE

[C indicates cases, D, deaths, P, present]

Place		January-February 1942	March 1942	April 1942—week ended— 4	11	18	25
AFRICA							
Basutoland	C		[1] 7				
British East Africa:							
Kenya	C	237					
Nairobi	C	61					
Uganda	C	104					
Madagascar	C	41	23				[2] 16
Morocco	C	38	75	5	15	2	4
Union of South Africa	C	16	15				
ASIA							
China							
Changteh Province	C	P					
Chekiang Province	C	P					
Shensi Province	D	30					
Suiyuan and Ninghsia Provinces	D	139					
India	C	349	40				
Indochina (French)	C	17	37				[2] 13
Palestine: Haifa	C	4					
SOUTH AMERICA							
Argentina: Cordoba Province	C	7					
Chile: Valparaiso	C	1					
Peru:							
Ancash Department	C	6					
Lambayeque Department	C	2	1				
Libertad Department	C	3	3				
Salaverry—Plague infected rats		P					
Lima Department	C	20	8				
Piura Department	C	4	3				
OCEANIA							
Hawaii Territory. Plague-infected rats		12	4			1	

[1] Suspected.
[2] For the month of April

SMALLPOX

[C indicates cases]

Place		January-February 1942	March 1942	April 1942—week ended— 4	11	18	25
AFRICA							
Algeria	C	245	81				
Belgian Congo	C	32					
Dahomey	C	36	4				
French Guinea	C	58	1				
Ivory Coast	C	50					
Morocco	C	726	173	34	47	30	40
Nigeria	C	323	29				
Niger Territory	C	127	8				
Senegal	C	9					
Tunisia	C		1				
Union of South Africa	C	272	16				
ASIA							
Ceylon	C	2	1	1			
China	C	7					
India	C	5,985	3,833				
Indochina (French)	C	679	613				[1] 615
Iran	C	28					
Iraq	C	138	26				
Palestine	C	7					
EUROPE							
France:							
Seine Department	C	24	17				
Unoccupied zone	C	13					
Portugal	C	17	7	2	1		
Spain	C	27	21	2	2		
NORTH AMERICA							
Canada	C		1	1			
Mexico	C	5	1				
SOUTH AMERICA							
British Guiana	C	1					
Colombia	C	6					
Venezuela (alastrim)	C	45	39				

[1] For the month of April

TYPHUS FEVER

[C indicates cases]

Place		January-February 1942	March 1942	April 1942—week ended— 4	11	18	25
AFRICA							
Algeria	C	9,196	7,133			[1] 4,174	
Basutoland	C	15					
British East Africa: Kenya	C	4					
China	C	7					
Egypt	C	3,417	4,237				
Ivory Coast	C	4					
Morocco	C	4,384	4,795	1,509	1,512	1,376	1,386
Niger Territory	C	1					
Sierra Leone	C	1					
Tunisia	C	4,165	3,138	800	583	676	
Union of South Africa	C	289					
ASIA							
India	C	5					
Iran	C	49	80	29	29	73	
Iraq	C	3	1				
Palestine	C	12	3				
Syria	C	10	12				

[1] For the period Apr. 1-20, 1942.

TYPHUS FEVER—Continued

[C indicates cases]

Place		January-February 1942	March 1942	April 1942—week ended—			
				4	11	18	25
EUROPE							
Bulgaria	C	94	197		33	42	
Czechoslovakia	C	5					
France:							
Seine Department	C		1				
Unoccupied zone	C	4		[2] 133	50	17	11
Germany	C	85					
Hungary	C	228	130	36	49	47	11
Irish Free State	C		2		1		
Portugal	C			1			
Rumania	C	1,382	686	74	189		171
Spain	C	1,975	1,374	96	84	51	
Canary Islands	C		1				
Turkey	C	86	107				
Union of Soviet Socialist Republics	C	67					
NORTH AMERICA							
Guatemala	C	28	6				
Jamaica	C	9	1	2	2		
Mexico	C	116	2	1	1		
Panama Canal Zone	C	1					
Puerto Rico	C	3					
SOUTH AMERICA							
Chile	C	12	4				
Ecuador	C	14					
Venezuela	C	2	1				
OCEANIA							
Australia	C	4					
Hawaii Territory	C	14	6			1	

[2] For the period Feb. 27–Apr. 7, 1942

YELLOW FEVER

[C indicates cases, D, deaths]

Place		January-February 1942	March 1942	April 1942—week ended—			
				4	11	18	25
AFRICA							
Belgian Congo: Libenge	D			[1] 1			
French West Africa	C	1					
Gold Coast	C		1				
Ivory Coast [2]	C	1					
Senegal.[3]							
Sierra Leone: Freetown	C	2					
Sudan (French)	D	[1] 1					
Togo: Hohoe	C	1					
SOUTH AMERICA [4]							
Colombia:							
Boyaca Department	D	2					
Intendencia of Meta	D	1					
Santander Department	D	1					

[1] Suspected.
[2] During the week ended May 2, 1942, 1 death from suspected yellow fever was reported in Divo Subdivision, Ivory Coast.
[3] According to information dated Feb. 9, 1942, 15 deaths from yellow fever among Europeans have occurred in Senegal.
[4] All yellow fever in South America is of the jungle type unless otherwise specified.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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AN ANALYSIS OF INDUSTRIAL HYGIENE ACTIVITIES IN STATE AND LOCAL HEALTH DEPARTMENTS, 1940–41 [1]

By V. M. TRASKO, *Junior Biometrician*, and J. J. BLOOMFIELD, *Sanitary Engineer*, *United States Public Health Service*

Thirty years ago industrial hygiene had its national genesis when the United States Public Health Service was authorized by an act of Congress to "extend its research functions to the study and investigation of all diseases of mankind and conditions influencing the propagation and spread thereof." It received its first real impetus in the first World War when definite measures were taken toward the conservation of the workers' health in the vital war industries. Ten years ago industrial health was the concern of health departments in only three States, and the labor department in one State. Five years ago the number had increased to seventeen, and today three-fourths of the States are engaged on a more or less limited scale in rendering practical health services to industry.

This unprecedented growth of industrial hygiene resulted in part from the great demand for social security which arose from the 1929 depression. Today its progress is being further stimulated by the crisis in our national defense. Perhaps never before has the importance of activities pertaining to the physical fitness of the worker been brought on so close a parallel with that of production itself.

With the accelerated expansion of industrial hygiene activities in State and local health departments came the gradual realization that a system of uniform reporting of the progress of such activities was needed. Consequently, at the second annual meeting of the National Conference of Governmental Industrial Hygienists, held in 1939, a plan was proposed and given a trial by a number of States (*1*). The first report on activities of the divisions in 20 States during the fiscal year 1940 appeared in the 1941 Transactions of the Conference (*2*). The present report represents a second and more complete attempt to summarize industrial hygiene activities over a given period of time.

[1] From the Division of Industrial Hygiene, National Institute of Health.

SCOPE OF ACTIVITIES

At present industrial hygiene activities are being carried on in 36 States, 1 Territory, 4 cities, and 2 counties. Almost all of the units have been established within the past 5 years, five since July 1, 1941. Reports covering the activities for the fiscal year July 1940 to June 1941 have been received from industrial hygiene units in 24 States and 4 cities as follows:

State industrial hygiene divisions:

California.	Michigan.	Rhode Island.
Colorado.	Minnesota.	South Carolina.
Connecticut.	Missouri.	Texas.
Idaho.	Montana.	Utah.
Illinois.	New Hampshire.	Virginia.
Indiana.	North Carolina.	Vermont.
Iowa.	Oklahoma.	West Virginia.
Kansas.	Pennsylvania.	Wisconsin.

Local industrial hygiene divisions:

Los Angeles, Calif.	Detroit, Mich.
Baltimore, Md.	St. Louis, Mo.

The 25 States in which these divisions function are well distributed geographically over the country. They include a labor force of approximately twenty-nine and one-half million workers, more than one-half of that for the whole country.

A total of 215 persons (22 for the part-time periods), including physicians, engineers, sanitarians, a few nurses, and clerks, carried on the activities which form the basis of this report. These divisions spent slightly more than one-half million dollars for this work, representing three-fourths of the appropriations for all States with industrial hygiene units at that time.

It can be seen that, on the whole, these units are functioning with a bare nucleus of personnel and inadequate budgets. The Division of Industrial Hygiene of the National Institute of Health has been able to meet some of the demands for additional personnel by assigning trained physicians, engineers, and chemists to these States on a lease-lend basis. Although the Division had such personnel on loan in only 4 States at the end of the 1940-41 fiscal year, this number has since been increased to 36 professional persons in 19 States, the District of Columbia, and the Tennessee Valley Authority. Moreover, the Division is able to supplement the lack of adequate physical facilities by lending field and laboratory equipment. For example, in one State a program for taking chest X-rays of workers in industry has been made possible by providing the necessary equipment. A nominal fee of 25 cents per worker is paid by the company, and it is estimated that, as a result, some 50,000 workers per year can thus be benefited.

Because industrial hygiene activities cover so broad a field that no one agency can hope to do the work itself, cooperative working

relationships are established with various governmental and nongovernmental agencies functioning in the States.

The present report gives a summary of industrial hygiene activities in 25 States during the fiscal year 1941, including an analysis of field investigations, and some information on laboratory activities, medical services, and educational and promotional activities. From time to time practical and illustrative examples will be given. It is not possible to mention all interesting and noteworthy activities or even to evaluate them justly. It must be sufficient in a report of this kind to mention a few, and to rely on rough analyses as an index of the extent and diversity of their activities.

THE EFFECT OF THE NATIONAL DEFENSE PROGRAM

Before proceeding with the results of the summary, some consideration must be given to the effect of the national defense program on the work of industrial hygiene divisions. In the absence of comparable peacetime data, it is not possible to estimate the extent to which the national defense program has not only stimulated but increased the work of these divisions. That the effect has been great is evidenced from individual comments on increased activities and on limitations in organization and facilities.

Already much has been said and written on conservation of manpower in industry, but much more needs to be said and done. Industrial production is increasing at so high a tempo that there is scarcely time to keep up with the many accompanying problems.

However, the State and local industrial hygiene divisions are doing all in their power to cope with the present emergency. Each division has revised its program so as to render immediate and direct service to plants producing defense materials. Lists of industries are obtained from various sources, chiefly, public contracts. Contact with these industries is frequently made by visits to the plants or through special form letters which explain the services and the facilities the divisions have to offer. When it is realized that practically every industry is concerned with war production, directly or indirectly, the magnitude of this undertaking is almost inconceivable. One State reported that if no additional contracts were let and no other major problem arose, it would require 3 to 5 years to study completely the defense industries alone. At the same time, while giving primary consideration to defense industries, routine work is not being neglected, although long-range studies have been postponed in practically all States.

The conversion and expansion of peacetime factories into establishments for the production of war materials and the construction of new factories mean that many workers are being employed in hazardous occupations before adequate control measures can be effected.

A typical example of this is found in one State having aircraft and shipbuilding industries. In this State an increased demand for mercury in the manufacture of munitions and scientific instruments has resulted in the reopening of old quicksilver mines, which began operation without the protective and control equipment necessary to prevent inhalation of mercury vapor and dust by the workers. As a result, several cases of mercury poisoning developed, prompting the industrial hygiene division to enforce preventive measures.

Frequently, because of its immediate contact with industry, the industrial hygiene division becomes the liaison agency for health problems of not only the worker but also his family. For instance, in one State the influx of new workers and their families has created health problems other than those associated with the working environment. Among these are the immunization of children, housing, food handling, and general community sanitation. The industrial hygiene division is meeting this problem by furnishing assistance to the Bureau of Communicable Diseases in having post cards, entitled "Parents Register for Health Service," distributed to employees through the managements in defense plants. In this way the families of new workers are acquainted with the various health services available in the community.

In addition to problems on occupational health hazards, there are many others which demand recognition. There is the ever-present problem of sickness not directly related to the industrial environment, which under normal conditions exacts a toll of approximately 400 million days absenteeism annually. The introduction of night and overtime work, with its attendant fatigue, the influx of new employees, crowding, and other hazards, will obviously increase the toll. Able-bodied men drawn into military service are being replaced by women, young adults, and older men. New materials and processes are being introduced, and the scarcity of less toxic substances is necessitating the substitution of toxic ones to meet the demands of production. These factors force the industrial hygienists to be on the alert and place greater responsibilities on them.

FIELD INVESTIGATIONS

The industrial plant investigation.—Of the many services rendered by State and local industrial hygiene units, only a few are capable of statistical evaluation, chief among these being field investigations. Industrial hygiene units in the 25 States reported that during the fiscal year 1941, field investigations were made in 6,084 establishments involving 1,509,797 workers. In this report, "establishment" and "worker" are used as the statistical units, although, as the analysis will reveal, a small portion of the investigations were made outside of industry.

A typical plant investigation calls for the combined efforts of the engineering, chemical, and medical personnel. Usually a preliminary survey of the plant is first made in order to obtain information on materials and processes associated with each occupation. The results are used as a guide in selecting particular occupations or operations for further study. For example, it may be necessary in an aircraft plant to study exposures to lead and zinc fumes in the foundry; silica dust at sandblasting operations; organic solvents in paint spraying and metal cleaning operations; trichlorethylene in degreasing; carbon monoxide, the mineral acids, and metallic fumes, such as chromium and cadmium in heat treating and plating operations; radioactive substances in dial painting operations; and fumes and glare during welding. Medical examinations of the workers may be indicated, including blood tests and urinalyses to determine the degree of absorption of such metals as lead and mercury; or chest X-rays of workers exposed to the siliceous or asbestos dusts may be necessary.

Physical characteristics of the workrooms are also noted, such as housekeeping practices, crowding, and safety hazards. The investigations may be extended to an evaluation of environmental conditions, such as ventilation, dampness, noise, illumination, and to provisions and practices concerning sanitation. The latter include appraisals of water supply, sewage and industrial waste disposal systems, evidence of cross connections, locker rooms, and eating facilities.

In addition to making physical examinations of the workers, the investigation may cover a study of the medical program of the plant, a subject receiving more and more consideration in industry today.

After the investigation has been made, recommendations for improvements and certain precautions to be taken during operations are offered to the management of the plant. This will also entail additional visits by the technical personnel to determine whether the recommendations have been carried out or have been properly enforced.

In brief, the investigation, as the term is used in this report, may refer to an environmental survey, an engineering study in one or more departments in the plant, or a survey of medical facilities and services. It may include one of these phases, or all three. An investigation in a small plant, covering a short period of time and requiring one or two visits at the most, received the same credit as a detailed engineering and medical evaluation of a plant employing thousands of workers, often taking months to complete and entailing laboratory analyses and medical examinations. Even the cursory inspection accomplishes a purpose, for requests are often received for revisits to assist in the control of additional hazards. Owing to the diversified nature of problems concerned with controlling health hazards in industry, no

specific, intelligible system can be worked out that will adequately describe both the extent and quality of such work.

Sources of investigation.—Table 1 presents a distinct breakdown according to the various types of investigations conducted in 3,662 establishments covering 849,385 workers. The necessary information was lacking on 660,412 workers and 2,276 plants where investigations resulted both from requests and planned programs. Because these investigations represent actual accomplishment, they are shown in this table, but are excluded from the following tabulations.

TABLE 1.—*Sources of investigations*

Source	Number		Percent	
	Establishments investigated	Workers involved	Establishments investigated	Workers involved
Total	6,084	1,509,797	100 0	100 0
Investigations reported in detail	(3,662)	(849,385)		
Requests	831	290,362	13.7	19 2
Planned program	2,595	535,110	42 6	35 5
Occupational disease reports	236	23,913	3.9	1.6
Other investigations:				
Not specified whether request or planned program [1]	2,276	660,412	37.4	43 7
Special investigations [2]	146	(3)	2.4	

[1] Estimated on basis of previous reports, ⅓ resulted from requests.
[2] 78 resulted from requests.
[3] Undetermined.

The table also shows that 146 other investigations, 78 resulting from requests, were made; the number of persons involved is indefinite. These investigations refer to air pollution studies of dusts and fumes given off in the neighborhood of industrial plants such as lead resmelting and fertilizer, compliances with other nuisance complaints, and special studies such as the revision of plans for construction of new defense plants and the installation of safety control measures.

It can be conservatively estimated, however, on the basis of previous and present reports from the two States which submitted incomplete reports on part of their activities, that of the 6,084 investigations, 27 percent resulted from requests, 69 percent from planned programs, and 4 percent from occupational disease reports.

An analysis of the sources of requests for the 831 investigations for which the necessary information was given shows 48 percent were made at the request of the plant management. Labor unions and employees accounted for 17 percent, labor departments within the States for 11 percent, and industrial commissions for 5 percent. This analysis indicates that 33 percent of the requests were made by labor and official labor organizations; the requests coming from industry itself increase the percentage to 81. Of the remaining 19 percent of the requests, 10 percent were made by State and local health departments while 9 percent were distributed among the State officials in

other than health departments, Federal agencies, insurance carriers, physicians, and residents.

The data reflect recognition on the part of industry and labor of the existence of potential health hazards, and a desire to evaluate and control them. In fact many of the studies were made in response to requests from management for technical services, such as quantitative determinations of dusts, gases, fumes, or mists, or the investigation of some particular condition suspected of being a potential hazard.

Extended studies, too, were often the outgrowth of requests. In one State such a study resulted from a request by a physician for information concerning 50 cases of dermatitis caused by wearing nylon hose. As a result, medical and environmental studies in cooperation with the National Institute of Health were made in four plants manufacturing hosiery. It was found that the finish used in the process was responsible for the dermatitis. A less toxic finish was substituted, benefiting not only the workers coming in contact with the substance but also the wearers of the hose.

In another State an interesting dust study was made as the result of a petition from residents of an area where surface dust was considered a health hazard. Some 10,000 residents were concerned, and in the course of the study some 600 physical examinations were made in cooperation with the local county health department.

The second source refers to investigations made as part of a planned program. The investigations, initiated by the agency itself, are usually long range studies of specific hazards in particular industries, such as carbon monoxide in garages, solvents in dry cleaning shops, evaluation of first aid facilities or nursing services. Such investigations are conducted by the agency itself or in cooperation with other interested agencies.

It has been estimated that 69 percent of all the investigations made were of this kind. Programs for promotional activities among the units are constantly expanding and as time goes on it is reasonable to suppose that self-initiated studies will decrease as more requests are received for industrial hygiene services. The past year, however, has been exceptional in this respect despite the growth of promotional activities in a number of States. Several factors have influenced the divisions to take the initiative. Some mention has already been made of the defense programs, which call for investigation of all plants with government contracts. Furthermore, increased production is giving rise to many problems with which the divisions are more likely to be familiar than the plant, because of their contact with research activities. The division of industrial hygiene is the technical agency to furnish such assistance, and must be on the alert for potential hazards.

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The engineering and medical survey of a large shipbuilding yard in one of the States and the study of occupational skin hazards in the aircraft industry in another State are examples of planned program investigations. In the latter study, 9 aircraft plants employing 87,000 workers were involved. Both studies were made with the cooperation of National Institute of Health personnel.

In one State, a study of 59 establishments manufacturing felt hats was conducted to determine the extent to which noncarrotted mercury fur was being used. Samples of all carrotting solutions were taken for analysis. From the data secured it was found that fur felt hats were being manufactured successfully with nonmercurial carrotting solutions, and that nonmercury carrotting solutions were being used in most of the fur preparation plants. These studies finally led to the adoption by many States of rules and regulations prohibiting the use of mercury solutions in the carrotting of hatters' fur.

The third source of investigation mentioned is occupational disease reports. Four percent, or 236 of all the investigations, were of this type and affected 23,913 workers. Ten States made reports on such investigations. Other States have reported the completion of plans for inaugurating occupational disease reporting, but on the whole this type of activity is in the early stages of development.

There are various reasons for this state of affairs. To begin with, only approximately half of the States require reporting of occupational diseases, and even in those States where the physician is paid to report such diseases, the reporting has not been found satisfactory. The situation is almost hopeless in States in which the report of the factory physician can be used in litigation. Even in those States where the report of a physician cannot be used in compensation suits, a fair degree of success can be anticipated only when close contact is maintained between each reporting physician and the agency to which occupational disease reports are sent.

Physicians should adopt the same attitude toward the reporting of occupational diseases as now exists with regard to the reporting of communicable diseases. The recurrence of such diseases may be obviated by a prompt investigation on the part of a State industrial hygiene service of those conditions in a plant which may be the causative agent, followed by prompt measures for the control of the environmental conditions responsible for the disease.

Industries investigated.—Table 2 presents information on the types of industries in which the field investigations were made. Of the 3,662 establishments investigated, 84.3 percent were in the manufacturing industries and an approximately equal percentage of workers, 84.6, were included in these investigations. With a few exceptions, the proportion of establishments varied slightly among the different groups. These exceptions include the iron and steel industries,

which accounted for the greatest number of plants investigated, 20.4 percent, and 15.1 percent of the workers, and the transportation equipment industries, such as shipbuilding, aircraft, and automobile, which covered the largest proportion of workers, 27.3 percent, in only 5.2 percent of the plants. Activities also included studies in the extraction of minerals industries, chiefly the metal mines and quarries, and mercury mines previously mentioned; and in the service industries, such as dry cleaning establishments, automobile repair shops, and garages.

TABLE 2.—*Industries in which investigations were conducted*

Industry or service groups	Number		Percent	
	Establishments investigated	Workers involved	Establishments investigated	Workers involved
All groups	3,662	849,385	100 0	100 0
Manufacturing industries:	(3,085)	(718,331)	(84 3)	(84 6)
Food and kindred products	306	31,582	8 4	3 7
Textile mill products	240	52,536	6 5	6 2
Apparel and other finished products	143	18,424	3 9	2 2
Lumber, furniture, and finished lumber products	175	17,336	4 8	2 0
Paper, printing, publishing, and allied industries	145	21,308	3 9	2 5
Chemical and allied, including products of petroleum	178	28,388	4 9	3 3
Rubber products	27	5,662	7	.7
Leather products	40	7,651	1 1	.9
Stone, clay, and glass products	270	19,754	7 4	2 3
Iron and steel and their products	749	128,224	20 4	15 1
Nonferrous metals and their products	250	41,496	6 8	4 9
Machinery (except electrical)	101	39,099	2 8	4 6
Electrical machinery	112	54,329	3 1	6 4
Transportation equipment, including automobiles	189	231,606	5 2	27 3
Miscellaneous manufacturing industries	160	20,936	4 4	2 5
Extraction of minerals	169	22,365	4 6	2 6
Dry cleaning plants and laundries	122	4,407	3 3	5
Auto and other repair shops	163	3,130	4 5	.4
Miscellaneous services as construction, transportation, etc.	7	11,529	1 0	1 3
Retail stores, offices, etc	67	17,631	1 8	2 1
Nonindustrial (schools, barracks, residences)	19	71,992	.5	8 5

Two other nonmanufacturing groups are shown. The first group consists of the transportation and construction industries, accounting for 1.0 percent of the establishments and 1.3 percent of the workers. The second group consisted of retail shops, offices, beauty shops, and like services. They also accounted for a small proportion of establishments and workers (1.8 and 2.1 percent).

The nonindustrial group (which points to the diversity of industrial hygiene activities) accounted for less than 1 percent of the investigations but involved 8.5 percent of the individuals, who had no connection with industrial production or service. Among these are schools, homes, hospitals, and barracks. Investigations were made of the carbon monoxide hazard, temperature and humidity in these places.

Owing to certain inconsistencies in reporting by a number of the divisions, no reliable breakdown of material exposures by industry group was possible. If such information is desired, reference may be

made to Public Health Bulletin No. 259 issued by the United States Public Health Service; this bulletin contains a representative list of material exposures for industry groups (*3*).

However, a tabulation of the 3,662 investigations was made according to whether the primary purpose—often coincident with the chief exposure or condition studied—was to investigate occupational hazards involving studies of air contaminants only, or whether the investigation was in the nature of a general survey in which the environmental conditions were also evaluated; or third, whether the immediate purpose was to evaluate medical provisions in the plant. The analysis showed that 37 percent of the investigations fell into the first group, and called for the greater portion of engineering studies requiring quantitative determinations of the atmosphere and, very frequently, medical examinations of the workers.

More than one-half of the investigations, or 56 percent, were surveys in which no specific condition was studied but rather the whole plant appraised. Occasionally, studies were limited to ventilation, illumination, or sanitation, but these were few. Usually the comprehensive survey dealt with all phases of industrial hygiene. The large proportion of the survey type of investigation is accounted for in the plans of divisions to make such investigations of defense industries, and further by the fact that one State reported a large number of preliminary surveys for the evaluation of the industrial hygiene problem of that State.

The remaining 7 percent of the investigations dealt with the physical condition of the workers, and industrial health problems such as fatigue, the incidence of respiratory and other diseases. Occasionally the purpose was to take periodic chest X-rays or to make routine medical examinations.

Recommendations.—An important factor in connection with field investigations is an evaluation of what has been accomplished. Most of the investigations were made because of known or suspected potential health hazards. In the control of these, certain recommendations were offered.

As may be observed from table 3, recommendations were made in 54 percent, or 1,977, of the 3,662 establishments investigated. A total of 513,046 workers were covered by the investigations in these plants although only 353,787, or 41.7 percent, of all the workers involved were affected by the recommendations. This is explained by the fact that a survey may take in the whole plant but improvements may be indicated in only one part of it. The analysis further revealed that in 1,546, or 42.2 percent, of all the plants no recommendations were made because none were implied or needed at the time. These plants included 306,608 workers, or 36.1 percent of the total. Finally, in the remaining 3.8 percent, or 139 establishments, the investigations

were completed but reports on recommendations were not submitted by the end of the fiscal year.

TABLE 3.—*Workers affected by recommendations*

Status of recommendations	Number		Percent	
	Establishments	Workers	Establishments	Workers
Establishments investigated	3,662		100 0	--
Workers involved	------	849,385		100 0
Recommendations made	[1] 1,977	353,787	54 0	41 7
(Not affected by recommendations)	-	(159,259)		(18 7)
No recommendations implied	1,546	306,608	42 2	36 1
Reports incomplete on recommendations	139	29,731	3 8	3 5

[1] The number of workers involved in investigation in these plants is 513,046, although only 353,787 were actually affected by recommendations

Table 4 presents data on the extent of compliance with the recommendations made. This is another instance in which accomplishment is difficult to evaluate adequately. Although information was offered in the annual reports of the specific type of recommendation made, it was decided for the sake of simplicity and brevity to group them according to the phase of the investigation implied. No account was taken of the number of recommendations but rather of the number of different workers affected. Likewise, no consideration was given to whether the recommendation called for improvements, repairs, additions of facilities, or new installations. In view of these limitations, it is hoped that these data will at least furnish an index to the type of condition needing correction.

This table shows that recommendations were reported as carried out for 235,925, or 66.7 percent, of the 353,787 workers affected by recommendations made. These totals represent the maximum number of workers, regardless of the number and type of recommendation as contrasted with the rest of the table in which the numbers do not necessarily refer to different workers. For example, some of the workers affected by recommendations on control of air contaminants may also be affected by recommendations on medical services as well, and even on sanitation. For this reason, the first and second columns will add to more than the totals given in each column, and hence the corresponding percentages in the third and fourth columns will add to more than 100 percent.

The most common phase of an investigation concerning which recommendations were made was engineering control of air contaminants. These particular recommendations affected 61.1 percent of the 353,787 workers; an equally large proportion, 65.6 percent, of all the workers for whom recommendations were carried out was represented by this type. Such recommendations may refer to respirators,

wet methods, enclosure of hazardous processes, and local exhaust ventilation systems. The last method of control is very flexible and can be applied in a variety of conditions associated with practical engineering measures for the elimination of dusts, fumes, or gases.

TABLE 4.—*Extent of compliance with recommendations*

Phase of investigation covered by recommendations	Number of workers affected by—		Percent of all workers affected by—		Percent of workers affected by compliance with recommendations on specific phases (2)+(1)
	Recommendations made (1)	Recommendations reported complied with (2)	Recommendations made (3)	Recommendations reported complied with (4)	
Total number of workers affected by recommendations regardless of number or kind	353,787	235,925			66 7
Engineering control of air contaminants	216,218	154,740	61 1	65 6	71.6
General ventilation	53,441	31,750	15.1	13 5	59 4
Substitution	2,408	1,623	.7	7	67 4
Personal protective measures	142,411	117,894	40 3	50 0	82 8
Illumination	16,357	9,878	4.6	4 2	60 4
Sanitation	48,704	33,709	13 8	14 3	69 2
Good housekeeping	32,794	16,511	9 3	7 0	50 3
Medical facilities	83,463	35,629	23 6	15 1	42 7

Recommendations concerning personal protective measures, such as the use of goggles, protective clothing, and ointments, were also common. They were made for 40.3 percent of the workers and were carried out for 50 percent. Ranking next were recommendations concerning medical services being made for 23.6 percent of the workers and complied with for 15.1 percent.

The remaining percentages ranged from 0.7 affected by recommendations on substitution of nontoxic substances for toxic ones to 15.1 percent on general ventilation, made chiefly in ventilation and temperature and humidity studies. The corresponding range of percentages for compliances were 0.7 percent for substitution and 14.3 percent for sanitation.

The last column in this table shows the percentage of workers affected by compliance with recommendations on specific phases of a study. It can be seen from this table that recommendations on personal protective measures are likely to be most frequently carried out and those on medical services least often. The percentages are 82.8 and 42.7, respectively. With respect to recommendations on control of air contaminants, the table shows that they were carried out for 71.6 of the affected workers. The remaining percentages ranged from 50.3 for good housekeeping practices to 69.2 for sanitation.

These data indicate that the agencies are not only active but are obtaining cooperation. In those instances where recommendations have not been reported as carried out, such factors as lack of time, personnel, and distances prevented the necessary follow-up work.

OCCUPATIONAL DISEASES

An important though at present not a major activity deals with epidemiological investigations of plants in which occupational diseases were reported. A total of 1,578 cases of illness was reported which resulted in the investigation of 236 establishments directly affecting 23,913 workers.

TABLE 5.—*Industries in which cases of occupational illness were investigated*

Industry group	Number of establishments investigated	Number of workers affected	All cases of illness reported	
			Number	Percent
All specified groups	210	23,548	1,536	100.0
Food and kindred products	17	6,864	911	59.3
Textile mill products, apparel	17	2,184	85	5.5
Lumber and furniture	20	135	14	.9
Chemical and allied	12	130	23	1.5
Leather products	7	2,262	15	1.0
Stone, clay, and glass products	4	22	8	.5
Iron and steel and their products	35	2,667	110	7.2
Nonferrous metals and their products	28	1,194	71	4.6
Electrical machinery	6	173	9	.6
Transportation equipment	22	7,350	216	14.1
Miscellaneous manufacturing industries	10	241	20	1.3
All other (garages, laundries, etc.)	32	326	54	3.5
Miscellaneous industries:				
Diagnosis of illness refuted	20	297	36	
Illness of nonoccupational origin	6	68	6	
Total	236	23,913	1,578	

In order to show the causes and hazards associated with these illnesses, two tables have been prepared. The first, table 5, presents by industry group the number of cases of all illness, and the number of establishments and workers affected. Because a few of the groups were small, certain combinations were made. This table also shows that of the 1,578 cases reported, investigations revealed that 6 were of nonoccupational origin, and for 36 others the diagnosis was disproved. This left a total of 1,536 cases of illness, which were considered in some detail. More than one-half, or 59.3 percent, were reported in the food and kindred products industries. The transportation industries accounted for the next largest proportion of cases, or 14.1 percent, and the iron and steel industries for 7.2 percent. The proportions in the other industries varied from 0.5 percent in the stone, clay, and glass industries, to 5.5 percent in the textile mill industries.

Table 6 shows the chief exposure or agent and the different causes of illness which gave rise to the investigations. Conjunctivitis and dermatitis were the two most frequent causes of illness reported, accounting for 86.2 percent of all the cases. One hundred and ninety cases of conjunctivitis were caused by welding glare, chiefly in the transportation industries, and the 687 cases of conjunctivitis which were caused by hydrogen sulfide gas were from harbor water used to

flume sardines in fish canneries. Two hundred and ten of the 446 cases of dermatitis were caused by contact with foods, such as sugar and tomatoes, while the remainder were caused by exposure to oils, textile and leather dressings, mercury compounds and many other agents. It is a well established fact that the dermatoses lead the causes of occupational diseases for which compensation is paid, ranging, according to reliable sources, from 60 to 70 percent. This proportion does not hold true in the present report, since almost twice as many cases of conjunctivitis as dermatoses were reported. However, it must be remembered that this report is an account of actual activities in these States and is not a study in which any sampling procedure was set down and followed. Furthermore, the 1,578 cases of occupational illness considered in this analysis do not by any means represent the total number of different cases reported in these States. The actual number is probably many times this total. The 1,578 cases were tabulated because they gave rise to investigations in 236 establishments and furnish an index to some interesting and useful information.

Among the cases of metallic poisoning, 53 were lead poisoning, 4 mercury poisoning, and of the 4 others not specified in the table, 2 were cases of cadmium poisoning, 1 zinc poisoning, and 1 metal fume fever.

The solvents also form an important group of systemic illnesses. Besides the 28 cases of benzol poisoning, the column "poisoning from other solvents" lists 9 others; 3 were due to carbon tetrachloride, 3 to trichlorethylene, and the 3 others to toluol, carbon disulfide, and naphtha.

Carbon monoxide poisoning accounted for 21 cases, and the various respiratory infections, such as bronchitis, for 18 others. Seven cases of silicosis were also investigated, the diagnosis for most of these being reported as doubtful. The group of miscellaneous cases includes, among others, poisoning caused by nicotine fumes, cotton disease, allergy, and isolated instances of poisoning from nitrous fumes and formaldehyde.

Specific recommendations for control measures were made for approximately 16,000 of the workers affected in these investigations. It is especially interesting to note that at the close of the fiscal year these were reported as carried out for 85 percent of the workers. This indicates an earnest desire on the part of industry to prevent the occurrence of more cases from the same sources.

LABORATORY ACTIVITIES

Because quantitative studies are often necessary in determining the degree of a hazard and the effectiveness of any control measure applied,

the laboratory becomes an essential facility of the industrial hygiene division.

TABLE 6.—*Distribution of the 1,536 cases of occupational illness by exposure or agent, and by cause*

Exposure or agent	All cases		Conjunctivitis	Dermatosis	Metallic poisoning			Benzol poisoning	Poisoning from other solvents	Carbon monoxide poisoning	Silicosis	Respiratory infection	Miscellaneous
	Number	Percent			Lead	Mercury	All other						
All cases—number	1,536	100 0	879	446	53	4	4	28	9	21	7	18	67
All cases—percent			57 2	29 0	3 4	3	3	1 8	6	1 4	4	1 2	4 4
Foods (sugar, tomatoes)	218	14 2		210									8
Chemicals, dyes, textile dressings	61	4 0		61									
Alkalies	5	3		4								1	
Oils (cutting and lubricating)	54	3 5		54									
Extreme temperatures	6	4		2									4
Welding rays	190	12 4	190										
Organic dusts	45	2 9	1	3								1	[1] 40
Siliceous and nonsiliceous dusts	13	8									7	6	
Metallic dusts	84	5 5		23	53	4	4						
Hydrogen sulfide	689	44 8	687										2
Other gases	27	1 8		2						21		3	1
Carbon tetrachloride	3	2							3				
Trichlorethylene	3	2							3				
Other solvents	35	2.3		1				28	3				3
Chrome acid	18	1 2		14								3	1
Other acids	20	1 3		19									1
Anthrax	6	4											6
All others	59	3 8	1	53								4	1

[1] 18 were cases of cotton disease, and 16 "allergy."

Laboratory facilities are not fully developed in all the States; in fact, a few States have no facilities at all, and must rely upon other divisions in the health department for laboratory services However, all but 3 of the 25 States which submitted reports were more or less actively engaged in laboratory work. They collected 14,847 material samples and specimens during the reporting year. Of this total, 1,173 were of blood, 768 of urine, and 239 of sputum. The remainder were samples of air, dusts, fumes, gases, mists, or chemical substances used in industry. No tabulation was attempted of the number of determinations made routinely and in development of methods on these samples, but this number was fairly large. However, a total of 3,417 field determinations was reported, including measurements of air velocities, illumination readings, and temperature and humidity measurements. In addition, many pieces of apparatus and other field equipment were designed and constructed.

MEDICAL SERVICES

The medical services that an industrial hygiene unit can offer to industry are varied. Sixteen of the 25 States reported that 11,000

medical examinations were made in connection with the investigations. This number represents the examinations made by personnel of the divisions either alone or in cooperation with other agencies. It does not include the countless numbers of examinations performed by industry itself as a result of the State investigations and recommendations, and the active promotional work done in this field.

Besides assisting with the examinations and taking chest X-rays, the personnel were often consulted in the diagnosis of occupational diseases; they reviewed physical examination records of workers in individual plants and interpreted chest X-rays for them. They not only encouraged and sponsored reporting on industrial absenteeism due to all forms of illness, but assisted in certain instances in setting up the appropriate machinery for such recording, and later in the analysis of the records.

A few divisions are furnishing direct assistance toward establishing nursing services in the plants, including the preparation of a roster of nurses interested and available for industrial nursing, and surveys of nursing practices prevailing in industry.

Often the divisions are not equipped to render direct medical services because of prevailing policies or lack of personnel. In such instances they establish cooperative working relationships with the local health agencies. For example, cooperative programs with local medical societies and other health agencies are being developed in one State for the promotion of medical examinations in small plants Two areas were selected to try out the program. A similar program has also been planned which provides for full-time health services in 7 counties of the State It will include a survey of all industrial plants in cooperation with private physicians located throughout these areas.

The same State reported a joint investigation by the local tuberculosis society in a garment plant employing approximately 400 women. The results disclosed that 11 active cases had been removed from the plant during the past 4 years. A total of 290 employees was X-rayed and of this number 3.8 percent were found positive. Follow-up on contacts of these cases will be made and cases will be placed under treatment if indicated. The company further agreed to conduct pre-employment medical examinations on all new employees.

EDUCATIONAL AND PROMOTIONAL ACTIVITIES

The need for stimulating interest in industrial hygiene has been felt, particularly since the industrial expansion program. The divisions learned that in order to sell their services they first had to sell themselves. Even today industry is not too well acquainted with industrial hygiene work, which until fairly recently has been either neglected or overshadowed by the over-all public health program.

By actual count, the divisions reported that they prepared or assisted in the preparation of 125 articles published in professional journals or in State departmental bulletins. They prepared 55 informative pamphlets, bulletins, and circulars which were distributed to employers, employees, physicians, and others. Personnel in these units made 255 speeches before audiences totaling approximately 25,000 persons at meetings, conferences, before professional societies and civic groups. They also reported 30 radio broadcasts for this period.

Fourteen exhibits were held, depicting activities of the divisions, or illustrating information on subjects such as industrial dermatoses, lead and carbon monoxide hazards in industry.

An activity that is constantly increasing in importance and extent is lecturing on industrial hygiene before students in medical, engineering, and vocational schools, before nurses in hospitals, and at present in a few defense training schools. At least 155 such lectures were presented with an attendance of approximately 10,000 students.

An analysis, based on titles, was prepared of the subject matter used in speeches, lectures, and publications. It showed that 24 percent of the subjects were on industrial hygiene in general, such as activities and functions of the divisions. Another 7 percent stressed the role of the national defense program in industrial hygiene. Eighteen percent of the subjects covered the medical phase, such as medical programs for industry, nursing activities, the role of the private physician in an industrial hygiene program, absenteeism reporting, and the incidence and control of syphilis and tuberculosis in industry. The remaining 51 percent of the subjects related to occupational diseases, and the engineering and chemical control of occupational health hazards.

A word may be said at this time about the consultation services that are given to industry and others by the divisions. No tabulation of these was made, although a number of the States offered the necessary information. The subjects were extremely varied, necessitating on the part of the divisions a well supplied technical and general reference library.

In addition, the divisions sponsor many general health programs in industry. For example, one State has launched a program for the organization of "Yours for Health" clubs. Membership includes both employees and employers, the former agreeing to do all they can to promote the sanitation, safety, and morale of the place where they work, and the latter pledging to protect the health of their workers. It is anticipated that this plan of cooperation between employers, employees, and the State government will do much to improve working conditions.

With the ultimate expansion in organization and facilities of these divisions, educational and promotional activities will, as a result, increase in scope and extent. Even now it is impossible to discuss the variety of these activities. Certain aspects have been mentioned, but there are others. Nothing has been said about the codes and regulations the divisions sponsor and write, nor about activities directed toward training plant personnel in carrying out plant programs of industrial hygiene. Moreover, as a result of the defense program outlined last spring, the United States Public Health Service and other organizations have found it desirable to send physicians, engineers, and chemists for in-service training with some of the well established State and local divisions.

CONCLUSIONS AND RECOMMENDATIONS

The present report is conclusive proof that reporting of industrial hygiene activities is not only possible but desirable. Literature on how to control and prevent industrial health hazards is abundant, but it is only within the past 2 years that any attempt has been made to estimate uniformly the extent to which these practical control measures are being complied with in industry. Were it not for the cooperation and the pioneer spirit of the divisions submitting the necessary data on their activities, even such a summary of progress as this report represents would not be possible. It is hoped that in time reporting will be extended to all States with industrial hygiene divisions. An inventory would be desirable of these activities in the whole country. Certain measures will also be required to improve the reporting with an aim towards uniformity of interpretation of what constitutes measurement of progress.

A report of this type serves many useful purposes. In the absence of any other criteria, it indicates the extent and diversity of industrial hygiene activities over a definite reporting period. It furnishes a justification, if one were needed, for the continuance of these activities. It further stimulates the keeping of good records within the States, information which can be used for measuring their own progress from year to year. And, finally, it furnishes, in perspective, an idea of not only what has been done but what needs to be done.

Several pertinent facts were brought out by this analysis. Of the twenty nine and one-half million workers in these 25 States, about one-half of whom are engaged in industries with potential health hazards, less than two million were reached through industrial hygiene services during the period of a year. With present personnel and budgets, this represents the peak load these divisions can evidently carry. The analysis further points out that probably one-half of the employees are working under conditions that need some correc-

tion or improvement. Instead of these conditions improving, they may be growing worse as the result of increased industrial production. Individual company reports have revealed, for example, that new health problems totally unrelated to normal times have been created and are causing bottlenecks in production; that days lost from sickness and accidents have increased; and that many instances of occupational diseases have developed as a result of the use of toxic materials, because the supply of relatively safe substances is being diverted for production of war materials, or cannot be replaced.

These conditions clearly indicate the need for more follow-up work in those plants where recommendations for improvements have been offered. More effort in this direction will mean more compliances. Experience has shown that industry is more likely to cooperate if convinced of the need for such improvements, and assured of the interest and determination on the part of the governmental agency responsible to see that they are carried out.

Another shortcoming in industrial hygiene programs is investigation of occupational diseases. The results of the analysis revealed that less than 4 percent of the investigations were made for this reason. The divisions can do much not only in stimulating such investigation but also in sponsoring and inaugurating the uniform reporting of occupational diseases. Practical measures will need to be taken in those States where necessary legislation has been set up but not enforced, and in others where no provision at all for such reporting has been made. Physicians need to be trained in the recognition of these diseases and convinced of the importance of reporting them in order to prevent their recurrence.

In addition, there is the problem of absenteeism reporting from all disabilities, an activity that is still unexplored. Industry is not fully aware of the importance of such statistics in determining the nature and extent of its health problems. In concentrating on the vital necessity of speeding up production, it is likely to overlook the somewhat obscure factor of lost time from sickness as a cause of impeded production. The divisions can sponsor and stimulate absenteeism reporting by persuading industry to adopt systems of keeping the necessary records. They can show industry how this is done, and even offer the necessary assistance in analyzing and interpreting the records, and then in formulating health programs to overcome the problems revealed.

Thus the information presented in this report emphasizes the crying need for augmented industrial hygiene programs in this country. It is true that almost all of these States have only begun this type of work within the past 5 years, and that time is necessary in order to develop none too familiar programs that call for concerted efforts on the

part of industry, governmental agencies, and others. But it is also true that the present wartime conditions cannot wait for the slow peacetime development of such programs. Since the State and local industrial hygiene divisions are identified with this work, and in order to keep pace with the demands of industrial production, accomplishment of what is expected will mean more trained personnel, budgets increased far beyond the present allotment of about one million dollars for such work in 36 States, and, if necessary, the revision of hampering policies and legislation pertaining to occupational diseases and accidents, and other preventive phases of industrial health. And, finally, the realization must be brought home that the workers who produce the airplanes and the guns must be as physically fit as the men who operate them.

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SULFAGUANIDINE NONEFFECTIVE IN THE TREATMENT OF TYPHOID FEVER AND TYPHOID CARRIERS

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Sulfaguanidine is being widely used in the treatment of bacillary dysentery with considerable success. Several reports have suggested that it be used in infections with *S. typhi*. Marshall, Bratton, et al, (*1*) and Bornstein and Straus (*2*) report in vitro experiments indicating definite action of the drug on typhoid bacilli. Levi and Willen (*3*) record the treatment of a typhoid carrier with sulfaguanidine after cholecystectomy. Chiefly because of the success of the drug in vitro, we have treated a small group of typhoid cases and carriers with sulfaguanidine.

Six hospitalized, moderately ill patients with proven typhoid fever were placed on sulfaguanidine therapy. Five-gram doses were given 4 times a day for periods of 8 to 10 days. In all of these cases, there was no unusual clinical improvement following the use of sulfaguan-

[1] From the Division of Infectious Diseases, National Institute of Health, and the Puerto Rican Department of Health.

idine. All recovered but there was no indication that the drug in any way affected the fever or other clinical signs and symptoms. Stool cultures were obtained daily. All became negative at about the usual time for the uncomplicated case of this disease, namely, about the time the temperature became normal.

In addition, cultures were made from 3 known chronic carriers of typhoid bacilli daily for 6 days, the carriers were then placed on sulfaguanidine. These patients received 15 grams per day for 14 days. Daily stool cultures were obtained. Table 1 summarizes the results of stool cultures obtained before, during, and after treatment. Both before and during treatment, daily cultures were taken; post-treatment cultures were made at weekly intervals. The last specimen examined was positive on all patients, this was at least 3 weeks after the drug was stopped. Furthermore, there was no diminution in the number of colonies found per plate of Wilson Blair medium.

It is evident that in the doses used sulfaguanidine is not effective in the treatment of either cases or carriers of *S. typhi*.

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(*2*) Bornstein, S., and Straus, L.: Selective action of sulfanilylguanidine on different salmonella types and its practical importance. Proc. Soc. Exper. Biol. and Med. **47**: 112–116, May, (1941).

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TABLE 1.—*Summary of stool cultures results on 3 typhoid carriers treated with sulfaguanidine*

	Number of cultures					
	Before treatment[1]		During treatment[1]		After treatment[2]	
	Positive	Negative	Positive	Negative	Positive	Negative
Case I	6		14		3	
Case II	5	1	13	1	3	1
Case III	5	1	12	2	4	

[1] Daily cultures.
[2] Weekly cultures.

DEATHS DURING WEEK ENDED MAY 23, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended May 23, 1942	Corresponding week, 1941
Data from 87 large cities of the United States:		
Total deaths	8,101	8,342
Average for 3 prior years	8,175	
Total deaths, first 20 weeks of year	177,623	180,990
Deaths per 1,000 population, first 20 weeks of year, annual rate	12 4	12 7
Deaths under 1 year of age	543	524
Average for 3 prior years	495	
Deaths under 1 year of age, first 20 weeks of year	11,300	10,530
Data from industrial insurance companies.		
Policies in force	64,976,912	64,842,605
Number of death claims	11,468	11,779
Death claims per 1,000 policies in force, annual rate	9 2	9 5
Death claims per 1,000 policies, first 20 weeks of year, annual rate	10 0	10 5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED MAY 30, 1942

Summary

Of the 9 communicable diseases included in the following weekly table, and for which data for earlier years are available, the current incidence of only 3—influenza, measles, and meningococcus meningitis—was above the 5-year (1937–1941) median expectancy during the current week.

The number of cases of meningococcus meningitis reported (81) was the same as that reported last week. The largest numbers of cases were reported in the Middle Atlantic and South Atlantic States. The total to date (first 21 weeks), 1,648 cases, is above that for any other year since 1937, when 3,332 cases had been reported for this period.

The incidence of poliomyelitis declined from 26 cases last week to 19 for the current week, as compared with a 5-year median of 22 cases.

Of 23 cases of Rocky Mountain spotted fever reported from 15 States only 4 cases were reported in the Mountain and Pacific area. Six cases occurred in Oklahoma.

Other reports include 1 case of anthrax in Pennsylvania, 188 cases of bacillary, 20 cases of amebic, and 93 cases of unspecified dysentery, 13 cases of infectious encephalitis (6 in Ohio), 34 cases of smallpox (11 in Illinois), 13 cases of tularemia, 100 cases of typhoid fever, and 35 cases of endemic typhus fever (12 in Georgia, 9 in Texas, and 6 in Florida).

The death rate for 88 large cities in the United States for the current week is 11.0 per 1,000 population, as compared with 11.3 for the preceding week and a 3-year (1939–41) average of 10.9.

Telegraphic morbidity reports from State health officers for the week ended May 30, 1942, and comparison with corresponding week of 1941 and 5-year median

Division and State	Diphtheria: Week ended— May 30, 1942	Diphtheria: Week ended— May 31, 1941	Diphtheria: Median 1937-41	Influenza: Week ended— May 30, 1942	Influenza: Week ended— May 31, 1941	Influenza: Median 1937-41	Measles: Week ended— May 30, 1942	Measles: Week ended— May 31, 1941	Measles: Median 1937-41	Meningitis, meningococcus: Week ended— May 30, 1942	Meningitis, meningococcus: Week ended— May 31, 1941	Meningitis, meningococcus: Median 1937-41
NEW ENG.												
Maine	0	1	0	1	---	---	62	76	106	3	0	0
New Hampshire	0	0	0	---	---	---	40	23	3	0	0	0
Vermont	0	0	0	---	---	---	290	23	23	0	0	0
Massachusetts	4	4	3	---	---	---	968	790	790	3	1	1
Rhode Island	0	0	0	---	---	---	200	0	59	0	1	0
Connecticut	0	0	1	2	1	1	400	397	181	4	0	0
MID. ATL.												
New York	13	9	21	[1] 6	[1] 1	[1] 6	776	2,731	2,181	9	7	5
New Jersey	1	9	7	1	1	4	661	1,223	990	2	0	0
Pennsylvania	9	16	23	1	---	---	1,143	4,664	1,969	7	2	6
E. NO. CEN.												
Ohio	6	4	8	9	6	6	309	1,716	1,362	0	0	1
Indiana	3	10	5	4	11	4	234	727	159	0	0	0
Illinois	23	16	36	15	9	18	287	1,248	417	0	1	1
Michigan [2]	1	2	2	---	1	2	450	1,639	667	0	1	1
Wisconsin	0	0	1	48	9	19	1,274	1,634	1,005	1	0	0
W. NO. CEN.												
Minnesota	2	0	1	---	3	1	514	22	46	1	0	0
Iowa	2	4	3	---	1	1	268	135	145	0	0	0
Missouri	10	1	7	1	---	1	189	472	53	3	1	0
North Dakota	0	1	1	4	---	---	18	22	22	2	0	0
South Dakota	1	0	0	---	---	---	53	4	4	0	1	
Nebraska	1	4	2	1	---	---	258	33	33	0	0	0
Kansas	1	10	5	4	2	1	287	358	358	0	0	1
SO. ATL.												
Delaware	0	0	0	---	---	---	20	80	13	0	0	0
Maryland [2]	5	0	3	1	4	2	300	411	165	7	1	0
Dist. of Col.	0	1	3	---	---	---	50	204	146	0	1	0
Virginia	2	8	8	75	71	26	167	919	465	9	2	1
West Virginia	3	3	3	4	8	17	22	526	35	0	0	1
North Carolina	3	10	8	2	---	3	557	1,294	715	0	0	1
South Carolina	3	7	7	146	192	128	141	670	68	0	1	1
Georgia	3	1	3	8	12	12	142	272	73	1	0	0
Florida	1	4	6	1	14	3	246	315	110	0	0	0
E. SO. CEN.												
Kentucky	1	2	5	1	---	4	63	610	148	0	1	1
Tennessee	2	4	4	10	10	16	33	365	131	2	0	0
Alabama	7	6	6	17	31	28	105	276	149	1	4	4
Mississippi [2]	5	2	3	---	---	---	---	---	---	3	1	1
W. SO. CEN.												
Arkansas	4	2	3	27	7	23	108	215	108	1	0	0
Louisiana	1	0	5	9	1	7	79	17	13	1	1	1
Oklahoma	3	5	3	29	17	17	98	127	95	1	0	1
Texas	16	16	23	182	419	163	641	562	498	5	3	2
MOUNTAIN												
Montana	1	0	0	4	---	1	145	24	31	2	0	0
Idaho	0	0	0	---	---	3	63	37	37	0	0	0
Wyoming	0	1	0	86	---	---	55	13	24	0	0	0
Colorado	5	6	8	82	17	8	203	379	231	1	0	1
New Mexico	1	0	1	2	---	1	23	81	75	0	0	0
Arizona	0	0	0	59	50	40	48	59	35	0	1	0
Utah [2]	0	0	0	5	1	---	978	28	73	1	0	0
Nevada	0	0	---	---	---	---	55	0	---	---	0	---
PACIFIC												
Washington	2	0	1	1	---	---	646	21	62	3	1	0
Oregon	0	1	1	6	7	9	135	79	79	0	0	0
California	6	5	22	55	1,203	31	5,312	386	386	8	1	1
Total	151	175	280	809	2,109	622	19,116	25,907	14,587	81	33	35
21 weeks	5,590	5,523	9,031	75,305	480,498	155,044	391,848	715,433	288,402	1,618	1,031	1,031

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended May 30, 1942, and comparison with corresponding week of 1941 and 5-year median

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	May 30, 1942	May 31, 1941		May 30, 1942	May 31, 1941		May 30, 1942	May 31, 1941		May 30, 1942	May 31, 1941	
NEW ENG.												
Maine	2	0	0	5	3	14	0	0	0	0	0	
New Hampshire	0	0	0	7	3	4	0	0	0	0	0	
Vermont	0	0	0	5	10	10	0	0	0	0	0	
Massachusetts	0	0	0	181	134	157	0	0	0	2	13	1
Rhode Island	0	0	0	4	1	6	0	0	0	0	0	0
Connecticut	0	0	0	21	39	52	0	0	0	0	0	4
MID ATL												
New York	3	1	1	247	389	643	0	0	0	5	7	7
New Jersey	0	0	0	80	144	181	0	0	0	2	1	2
Pennsylvania	0	0	0	307	339	339	0	0	0	8	6	8
E NO CEN												
Ohio	1	0	1	195	232	300	0	0	1	2	2	8
Indiana	0	0	0	39	81	87	0	0	9	2	0	2
Illinois	1	0	1	194	179	364	11	4	9	4	2	4
Michigan [2]	0	0	0	192	182	381	0	7	7	4	1	2
Wisconsin	1	0	0	135	89	155	3	2	3	0	1	1
W NO CEN												
Minnesota	0	0	0	52	48	78	0	0	11	2	0	0
Iowa	0	1	1	30	16	61	0	8	31	1	3	2
Missouri	0	0	0	40	81	55	1	2	11	5	4	2
North Dakota	0	0	0	5	0	6	0	0	1	0	0	0
South Dakota	0	1	0	10	9	8	0	3	3	0	0	0
Nebraska	0	0	0	13	15	15	2	0	2	0	0	0
Kansas	1	0	0	54	24	53	0	0	11	0	2	2
SO ATL												
Delaware	0	0	0	17	16	4	0	0	0	0	0	1
Maryland [2]	0	0	0	53	46	38	0	0	0	9	3	3
Dist of Col	0	0	0	5	11	13	0	0	0	0	0	1
Virginia	1	0	0	7	17	17	0	0	0	4	7	5
West Virginia	1	0	0	24	20	24	0	0	0	0	6	3
North Carolina	0	0	0	14	9	18	0	0	0	1	1	4
South Carolina	1	0	0	2	4	4	0	0	0	0	2	3
Georgia	0	0	0	8	9	9	2	0	0	9	4	8
Florida	1	5	1	2	1	5	0	0	0	4	2	6
E SO CEN												
Kentucky	0	0	0	36	59	37	0	3	2	2	5	5
Tennessee	0	1	0	11	44	25	0	3	3	1	2	5
Alabama	1	0	0	5	20	7	0	0	1	4	3	3
Mississippi [2]	0	1	1	2	1	2	1	1	0	0	1	2
W SO CEN												
Arkansas	0	1	0	7	4	4	7	5	9	3	2	
Louisiana	1	0	1	4	2	10	0	0	1	7	13	8
Oklahoma	0	1	0	12	9	14	0	2	2	4	1	5
Texas	0	3	2	36	16	21	1	0	4	8	11	11
MOUNTAIN												
Montana	1	0	0	10	7	14	0	0	2	0	0	0
Idaho	0	0	0	2	7	4	0	0	0	0	0	1
Wyoming	0	0	0	15	2	4	0	0	1	0	0	0
Colorado	0	0	0	10	13	42	2	0	2	0	1	2
New Mexico	0	0	0	0	1	10	0	0	0	1	1	1
Arizona	0	0	0	3	6	5	1	0	0	0	1	1
Utah [2]	0	0	0	20	5	11	0	0	0	0	0	0
Nevada	0	0	------	0	0	------	0	0	------	0	0	------
PACIFIC												
Washington	0	0	0	26	14	36	2	0	4	0	6	2
Oregon	0	0	0	2	4	9	1	1	2	0	1	1
California	3	7	5	83	60	94	0	1	15	6	6	5
Total	19	22	22	2,232	2,435	3,476	34	42	269	100	121	149
21 weeks	436	466	442	76,813	76,508	101,249	471	958	6,508	1,700	1,747	2,414

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended May 30, 1942

Division and State	Whooping cough week ended— May 30, 1942	Whooping cough week ended— May 31, 1941	Anthrax	Week ended May 30, 1942: Dysentery, Amebic	Dysentery, Bacillary	Dysentery, Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	24	25	0	0	0	0	0	0	0	0	0
New Hampshire	3	5	0	0	0	0	0	0	0	0	0
Vermont	30	11	0	0	0	0	0	0	0	0	0
Massachusetts	196	203	0	0	2	0	0	0	0	0	0
Rhode Island	28	24	0	0	0	0	0	0	0	0	0
Connecticut	105	47	0	0	0	0	0	0	1	0	0
MID. ATL.											
New York	323	215	0	1	0	0	3	0	1	1	0
New Jersey	308	73	0	0	0	0	1	0	2	0	0
Pennsylvania	238	316	1	2	0	0	0	0	1	0	1
E. NO CEN.											
Ohio	145	235	0	0	0	0	6	0	1	0	0
Indiana	68	47	0	0	0	0	1	0	0	0	0
Illinois	286	101	0	0	0	0	0	0	0	0	0
Michigan [2]	279	290	0	0	0	0	0	0	0	0	0
Wisconsin	184	113	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	20	68	0	2	0	0	0	0	0	0	0
Iowa	18	29	0	0	0	0	0	0	0	0	0
Missouri	8	64	0	0	0	0	0	0	1	0	0
North Dakota	9	10	0	0	0	1	0	0	0	0	0
South Dakota	0	7	0	0	0	0	0	0	0	0	0
Nebraska	0	17	0	0	0	0	0	0	0	0	0
Kansas	34	146	0	0	0	0	0	0	0	1	0
SO. ATL.											
Delaware	1	0	0	0	0	0	1	0	0	0	0
Maryland [2]	38	95	0	0	0	1	0	0	1	0	0
Dist. of Col.	17	10	0	0	0	0	0	0	0	0	0
Virginia	89	53	0	0	0	46	0	0	1	0	1
West Virginia	8	91	0	0	0	0	0	0	0	0	0
North Carolina	165	222	0	0	0	0	0	0	1	0	0
South Carolina	74	234	0	0	0	0	0	0	0	0	0
Georgia	35	24	0	0	8	0	0	0	1	1	12
Florida	38	33	0	2	1	0	0	0	0	0	6
E. SO. CEN.											
Kentucky	124	65	0	0	0	0	0	0	2	0	0
Tennessee	94	100	0	0	0	0	0	0	0	0	0
Alabama	35	123	0	0	0	0	0	0	0	0	4
Mississippi [2]	------	-------	0	0	0	0	0	0	0	0	0
W. SO. CEN.											
Arkansas	32	43	0	1	0	0	0	0	0	5	0
Louisiana	2	2	0	2	0	0	0	0	0	0	2
Oklahoma	13	15	0	0	0	0	0	0	6	0	0
Texas	160	294	0	9	176	0	0	0	0	2	9
MOUNTAIN											
Montana	32	12	0	0	0	0	1	0	2	1	0
Idaho	3	11	0	0	0	0	0	0	0	0	0
Wyoming	4	7	0	0	0	0	0	0	1	0	0
Colorado	19	187	0	0	0	0	0	0	0	0	0
New Mexico	22	13	0	0	0	0	0	0	0	2	0
Arizona	18	18	0	0	0	45	0	0	0	0	0
Utah [2]	34	51	0	0	0	0	0	0	0	0	0
Nevada	5	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	37	126	0	0	0	0	0	0	0	0	0
Oregon	14	17	0	0	0	0	0	0	1	0	0
California	333	568	0	1	1	0	0	0	0	0	0
Total	3,752	4,460	1	20	188	93	13	0	23	13	35
21 weeks	80,538	97,886									

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended May 16, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	3	1	1	0	3	0	2	0	0	4
Baltimore, Md	1	0	2	1	265	5	11	0	27	0	1	26
Barre, Vt	0	0	------	0	0	0	0	0	0	0	0	2
Billings, Mont	1	0	------	0	18	0	0	0	0	0	0	0
Birmingham, Ala	0	0	1	1	3	0	2	0	2	0	0	0
Boise, Idaho	0	0	------	0	3	0	0	0	0	0	0	0
Boston, Mass	1	0	------	0	249	5	12	0	83	0	1	41
Bridgeport, Conn	0	0	------	0	18	0	1	0	1	0	0	6
Brunswick, Ga	0	0	------	0	21	0	1	0	0	0	1	0
Buffalo, N. Y	0	0	------	0	17	0	6	0	11	0	0	5
Camden, N. J	2	0	------	0	1	0	1	0	9	0	0	2
Charleston, S. C	0	1	4	0	10	0	0	0	0	0	0	5
Charleston, W. Va	0	0	------	0	0	0	0	0	0	0	1	0
Chicago, Ill	10	0	------	2	47	0	24	0	55	0	0	104
Cincinnati, Ohio	0	0	------	1	4	0	5	0	22	0	0	8
Cleveland, Ohio	3	0	------	0	7	1	5	0	61	0	1	30
Columbus, Ohio	0	0	------	0	55	0	2	0	7	0	0	9
Concord, N H	0	0	------	0	1	0	1	0	0	0	0	0
Cumberland, Md	0	0	------	0	0	0	0	0	1	0	0	0
Dallas, Tex	1	0	2	2	57	0	3	0	3	0	1	2
Denver, Colo	5	0	14	1	115	0	5	0	2	0	0	9
Detroit, Mich	3	0	------	0	20	0	10	0	145	0	2	72
Duluth, Minn	0	0	------	0	5	0	1	0	7	0	0	5
Fall River, Mass	1	0	------	1	39	0	0	0	19	0	0	0
Fargo, N. Dak	0	0	------	0	6	0	0	0	3	0	0	0
Flint, Mich	0	0	------	1	1	0	2	0	3	0	0	2
Fort Wayne, Ind	0	0	------	0	2	0	2	0	0	0	1	0
Frederick, Md	0	0	------	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	------	0	3	0	0	0	0	0	0	5
Grand Rapids, Mich	0	0	------	0	97	0	0	0	1	0	1	3
Great Falls, Mont	0	0	------	0	48	0	3	0	0	0	0	6
Hartford, Conn	0	0	------	0	65	0	0	0	1	0	0	7
Helena, Mont	0	0	------	0	16	0	0	0	1	0	0	0
Houston, Tex	3	0	------	0	17	0	8	0	5	0	1	4
Indianapolis, Ind	0	0	------	0	228	0	6	0	22	0	0	32
Kansas City, Mo	2	0	------	0	92	0	5	0	19	0	0	1
Kenosha, Wis	0	0	------	0	7	0	0	0	1	0	0	13
Little Rock, Ark	0	0	------	0	4	0	1	0	0	0	0	0
Los Angeles, Calif	0	0	13	1	524	2	7	0	17	0	0	14
Lynchburg, Va	1	0	------	0	0	0	1	0	1	0	0	34
Memphis, Tenn	0	0	------	1	30	0	1	0	3	0	0	13
Milwaukee, Wis	0	0	------	0	246	0	3	0	31	0	1	72
Minneapolis, Minn	1	0	------	1	393	0	3	0	6	0	0	6
Missoula, Mont	0	0	------	0	41	0	1	0	1	0	0	0
Mobile, Ala	0	0	2	1	3	0	1	0	0	0	0	0
Nashville, Tenn	0	0	------	3	2	0	0	0	2	0	0	8
Newark, N. J	0	0	1	0	369	1	5	0	23	0	0	54
New Haven, Conn	0	0	------	0	113	0	1	0	2	0	0	7
New Orleans, La	1	0	2	1	65	3	5	0	5	0	0	5
New York, N. Y	14	2	5	0	166	12	38	3	224	0	2	218
Omaha, Nebr	1	0	------	0	180	0	2	0	7	0	0	1
Philadelphia, Pa	1	0	1	0	38	1	18	0	189	0	1	68
Pittsburgh, Pa	1	0	------	0	12	2	15	0	14	0	1	17
Portland, Maine	0	0	------	0	18	0	1	0	1	0	0	0
Providence, R. I	0	0	------	0	204	0	6	0	3	0	0	23

City reports for week ended May 16, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Pueblo, Colo	0	0	------	0	3	0	1	0	2	0	0	4
Racine, Wis	0	0	------	0	351	0	0	0	4	0	0	31
Reading, Pa	0	0	------	0	11	0	1	0	0	0	0	12
Richmond, Va	0	1	------	0	2	2	2	0	2	0	0	1
Roanoke, Va	0	0	------	0	1	0	0	0	0	0	0	0
Rochester, N. Y	0	0	------	0	9	0	2	0	8	0	0	11
Sacramento, Calif	1	0	1	1	90	0	4	0	0	0	0	28
Saint Joseph, Mo	1	0	------	0	3	0	1	0	0	0	0	0
Saint Louis, Mo	0	0	------	0	77	3	6	0	21	0	0	2
Saint Paul, Minn	1	0	------	2	110	0	3	0	3	0	0	23
Salt Lake City, Utah	------	0	------	------	175	0	5	0	6	0	0	6
San Antonio, Tex	3	0	1	1	18	0	7	0	1	0	0	2
San Francisco, Calif	0	0	------	1	374	2	6	0	10	0	0	17
Savannah, Ga	0	0	10	0	4	0	3	0	0	0	0	0
Seattle, Wash	1	0	------	1	134	1	5	0	1	0	1	20
Shreveport, La	1	0	------	0	1	1	2	0	0	0	0	0
South Bend, Ind	0	0	------	0	2	0	0	0	3	0	0	4
Spokane, Wash	0	0	------	0	29	0	2	0	1	0	0	7
Springfield, Ill	0	0	------	0	42	0	0	0	3	0	0	0
Springfield, Mass	1	0	------	0	59	0	4	0	17	0	0	21
Superior, Wis	0	0	------	0	4	0	0	0	0	0	0	0
Syracuse, N. Y	0	0	------	0	276	1	1	0	3	0	0	30
Tacoma, Wash	0	0	------	0	0	0	2	0	0	0	0	3
Tampa, Fla	0	0	------	0	26	0	0	0	0	0	0	0
Terre Haute, Ind	0	0	------	0	2	0	1	0	0	0	0	1
Topeka, Kans	0	0	------	0	41	0	1	0	0	0	0	3
Trenton, N. J	0	0	1	0	3	0	3	0	5	0	0	4
Washington, D. C	0	0	------	0	106	4	10	0	6	0	0	19
Wheeling, W. Va	0	0	------	0	6	0	1	0	1	0	0	0
Wichita, Kans	0	0	------	0	102	0	3	0	1	0	1	0
Wilmington, Del	0	0	------	0	4	0	1	0	1	0	0	0
Wilmington, N. C	0	0	------	0	6	0	2	0	0	0	0	0
Winston-Salem, N. C	0	0	------	0	9	0	1	0	1	0	0	0
Worcester, Mass	0	0	------	0	2	0	4	0	11	0	0	86

Dysentery, amebic.—Cases: Los Angeles, 2; New York, 4; Pittsburgh, 1; San Antonio, 1.
Dysentery, bacillary.—Cases: Chicago, 1; Los Angeles, 1; New York, 1; San Antonio, 1.
Encephalitis, infectious.—Cases: New York, 2, Richmond, 1.
Rocky Mountain spotted fever.—Cases: Baltimore, 1.
Tularemia.—Cases: Charleston, S. C., 1; Little Rock, 1; New Orleans, 1.
Typhus fever.—Cases. Birmingham, 9; Charleston, S. C., 2; Houston, 1; New Orleans, 1; San Antonio, 1; Shreveport, 2.

Rates (annual basis) per 100,000 population for the group of 89 selected cities in the preceding table (estimated population, 1942, 34,085,159)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended May 16, 1942	9.48	9.64	3.82	922.15	47.73	176 38	0.00	2.75	195.51
Average for week 1937-41	14.69	14.22	4.48	[1] 707.43	68.80	273.94	2.32	3.40	196.96

[1] Median.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended May 2, 1942.—During the week ended May 2, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			2	1	6				2	11
Chickenpox		6		131	286	39	46	14	96	618
Diphtheria		14	2	6	1	5	9	2	1	40
Dysentery				5						5
Encephalomyelitis							1			1
German measles		3	16	32	68	2	20	5	18	164
Influenza					16	1			7	24
Measles			3	413	259	157	30	6	22	890
Mumps	1	15	5	219	384	93	283	34	408	1,442
Pneumonia		5			9	2			38	54
Poliomyelitis				1						1
Scarlet fever	10	27	10	119	228	23	99	47	32	595
Trachoma									1	1
Tuberculosis		30	7	147	56		3		32	275
Typhoid and paratyphoid fever		1		13	6	1	5		1	27
Undulant fever				2	3					5
Whooping cough				210	70	1		5	84	370
Other communicable diseases		5		4	244	34	2	1	1	291

SWEDEN

Notifiable diseases—March 1942.—During the month of March 1942, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	13	Scarlet fever	1,506
Diphtheria	70	Syphilis	36
Dysentery	145	Typhoid fever	4
Gonorrhea	793	Undulant fever	7
Paratyphoid fever	10	Weil's disease	1
Poliomyelitis	4		

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalance of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Typhus Fever

Bulgaria.—During the week ended May 2, 1942, 57 cases of typhus fever were reported in Bulgaria. For the week ended April 25, 39 cases were reported.

Hungary.—During the week ended May 16, 1942, 35 cases of typhus fever were reported in Hungary.

Iraq.—During the week ended April 18, 1942, 7 cases of typhus fever were reported in Iraq.

Morocco.—During the week ended May 9, 1942, 1,021 cases of typhus fever were reported in Morocco.

Rumania.—During the week ended May 16, 1942, 141 cases of typhus fever were reported in Rumania.

Spain.—During the week ended April 25, 1942, 34 cases (11 in Madrid and 12 cases in Barcelona) were reported in Spain.

Yellow Fever

Brazil—Acre Territory.—Yellow fever was reported in Acre Territory, Brazil, as follows: 1 death on December 19, 1 death on December 27, and 1 death on December 28, 1941.

COURT DECISIONS ON PUBLIC HEALTH

City health officer—recovery of compensation—qualifying for office.—(New York Court of Appeals; *Ginsberg* v. *City of Long Beach*, 36 N.E. 2d 637, decided July 29, 1941.) The plaintiff sued to recover his salary as health officer of the city of Long Beach for the period from December 1, 1936, to February 28, 1938. The amount which he recovered in the trial court was reduced by the Appellate Division of the Supreme Court of New York and the case went to the court of appeals on his appeal only.

The court of appeals agreed with the appellate division's conclusion that the office was vacant after June 1936, because of the plaintiff's failure to qualify himself therefor in accordance with the directions of the public health council and that he was, therefore, entitled to no recovery for the period from December 1, 1936, to October 9, 1937. On the latter date the plaintiff was again appointed to the then vacant office on his fulfillment of the conditions imposed by the public health council, and for the period subsequent to this appointment the ap-

pellate division allowed him a recovery upon the basis of his salary as fixed by the city council in amounts which, for part of this period, were less than the minimum salary of a health officer prescribed by the public health law. The plaintiff contended that the city council had no power so to fix his salary, but the court of appeals was of the view that this contention was not open to him because he had failed, after his appointment on October 9, 1937, to file his official oath of office within the time prescribed by the public officers law. On that default, according to the court, the appointment was vitiated and the office again became vacant. "Plaintiff was thus entitled to no recovery for either of the periods in question and his complaint should have been dismissed. The defendant city cannot now have that relief, however, in view of its failure to appeal to this court."

The judgment of the appellate division was affirmed.

County health department—petition to submit question of establishment to voters—withdrawal of names of signers after expiration of time for filing.—(Kentucky Court of Appeals; *Commonwealth ex rel. Meredith, Atty. Gen., et al.* v. *Fife, County Judge of Hardin County,* 156 S.W.2d 126; decided November 11, 1941.) A Kentucky statute authorized the fiscal court to provide for the creation, establishment, and maintenance of a county health department with the proviso that "after such resolution is entered, the voters within thirty days may enter their protest against same by filing with the county judge a petition signed by twenty legal voters requesting that the establishment of such county health departments be done by the vote of the people of such county as herein provided." On February 10, 1941, a county fiscal court provided for the establishment of a health department in the county and within thirty days after that date a petition signed by twenty-six legal voters of the county was filed with the county judge. After the expiration of the 30-day period 7 of the signers of the petition withdrew their names from it and the question before the Court of Appeals of Kentucky was whether the county judge had the right to call an election.

The appellate court said that, if it upheld the right of the 7 persons to withdraw their names from the petition (the 30-day period having expired), the purpose of the election on the proposition of establishing a health unit in the county would be defeated and expressed itself as being of the view that common sense and fairness supported the conclusion that signers should not be permitted to withdraw their names from a petition calling an election when such action would defeat the purpose of the petition. "The county judge of Hardin County acquired jurisdiction to call the election when, after the expiration of 30 days, he had in his hands a petition signed by more than 20 legal voters. * * * We do not think that signers to

petitions calling elections should be permitted to oust the county judge of his jurisdiction under circumstances such as those involved in this case." The court then went on to say that the parties should not be permitted to mislead the advocates of the election into the belief that a good petition had been filed and that to permit them to withdraw their names after the time for filing the petition had expired would be putting the court in the position of sanctioning what might well be termed deception or even fraud. This it was not disposed to do. Public policy, said the court, demands otherwise.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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Public Health Reports

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DISTRIBUTION OF HEALTH SERVICES IN THE STRUCTURE OF STATE GOVERNMENT*

CHAPTER V—SANITATION BY STATE AGENCIES

By JOSEPH W. MOUNTIN, *Assistant Surgeon General*, and EVELYN FLOOK, *United States Public Health Service*

Current public health programs, which embrace some thirty-five separate categories of activity, represent a blending of old and new concepts concerning public responsibility in matters pertaining to community and personal health; yet the basic objective of any public health program has always been the control of communicable diseases. Since it was discovered quite early that certain types of disease are transmitted through food and water, environmental sanitation soon became one of the outstanding public health weapons. Development of this specific field of activity parallels the development of the entire public health movement. In other words, the scope of environmental sanitation, like that of the whole public health realm, has expanded with the passage of time. Whereas the first sanitation efforts were directed primarily toward abatement of nuisances, sanitary supervision of water supplies and sewage disposal facilities may be regarded as the earliest definitive measures. These several efforts have gradually broadened until they now include prevention

* From the States Relations Division. This is the first section of the fifth chapter of the third edition of Public Health Bulletin No. 184. The two remaining sections of this chapter, Sanitation of Foods and Drugs and of Food-handling Establishments and Miscellaneous Sanitation Activities, will be published in the next issue of the PUBLIC HEALTH REPORTS. Previous chapters are.

Mountin, Joseph W., and Flook, Evelyn: Distribution of health services in the structure of State government—Chapter I. The composite pattern of State health services. Pub. Health Rep., 56:1673 (August 22, 1941). Reprint No. 2306.

Mountin, Joseph W., and Flook, Evelyn: Distribution of health services in the structure of State government—Chapter II. Communicable disease control by State agencies. Pub. Health Rep., 56:2233 (November 21, 1941). Reprint No. 2334.

Mountin, Joseph W., and Flook, Evelyn: Distribution of health services in the structure of State government—Chapter III. Tuberculosis control by State agencies. Pub. Health Rep., 57:65 (January 16, 1942). Reprint No. 2348.

Mountin, Joseph W., and Flook, Evelyn: Distribution of health services in the structure of State government—Chapter IV. Venereal disease control by State agencies. Pub. Health Rep., 57:553 (April 17, 1942). Reprint No. 2360.

Succeeding chapters will be published in subsequent issues of the PUBLIC HEALTH REPORTS.

of stream pollution; sanitation of milk, shellfish, and other foods, as well as the food-handling establishments; recreational sanitation, covering swimming pools, bathing beaches, roadside picnic grounds, and camps of various kinds; housing and plumbing control; garbage collection and disposal; and control of insect vectors of disease. Recently there has been a distinct revival of interest in air sanitation, which covers temperature, humidity, dust, smoke, fumes, odors, and bacteria—especially the viruses.

Naturally, this expansion has not occurred with complete uniformity among the several States. Neither has it been entirely centered within the health department, the agency normally responsible for activities designed to promote and conserve human health. At the same time, certain common characteristics have been observed consistently in all State sanitation programs. While these facts are known in a general way, the literature apparently contains no source material which depicts the situation as it exists State by State. True, Public Health Bulletin No. 184 (Revised), "Health Departments of States and Provinces of the United States and Canada,"[1] pictures the sanitary engineering function of State health departments as it applied in 1930. However, since the last decade has witnessed such remarkable growth in the many branches of public health endeavor, statements contained in this publication now appear to be outmoded. Consequently, a third edition of Public Health Bulletin 184—bringing information up to date as of the year 1940—was undertaken.

From data collected by the United States Public Health Service in pursuance of this project, it is possible to describe the sanitation activities carried on, not by the health department alone but by all official agencies of State government during the survey year (1940), together with the extent to which agreement and disagreement obtain among the various plans. Construction of such a picture is the purpose of this article which is the fifth chapter of the series "Distribution of Health Services in the Structure of State Government,"[2] the third edition of Public Health Bulletin No. 184. As pointed out in previous chapters of this series, the survey referred to was limited to activities having a direct bearing on human health. Only those carried on by all departments of State government were included; contributions of voluntary and local health agencies were not taken into account.

Because of the numerous ramifications of the complete problem of sanitation, discussion is facilitated by grouping activities of the several agencies of State government under three major headings,

[1] Ferrell, John A., Smillie, Wilson G., Covington, Platt W., and Mead, Pauline A.; International Division of the Rockefeller Foundation for the Conference of State and Provincial Health Authorities of North America, Health Departments of States and Provinces of the United States and Canada. Public Health Bulletin No. 184 (Revised). United States Government Printing Office, Washington, 1932.

[2] See footnote *.

namely, sanitation of water supplies and sewerage systems, control of foods and drugs, and miscellaneous sanitation activities. Each field of service will be accorded a separate section in this report and the functions of State agencies in over-all programs for the several branches of sanitation will be summarized according to the extent of their participation in any one or any combination of the following types of activities: Regulation, promotion, education, supervision and/or consultation, financial aid, and direct service.

SANITATION OF WATER SUPPLIES AND SEWERAGE SYSTEMS

Water supplies and sewerage systems which serve a community are classified as "public," and those which serve a single family are designated as "private." Between these two extremes are facilities termed "semipublic"—those designed for tourist camps, roadside parks, comfort stations, industrial establishments, schools, hospitals, or other institutions serving a number of persons but not connected with public accommodations. Because the existing types of water supplies and sewage disposal facilities are so widely diversified, their sanitary control involves problems ranging from the design and operation of a complex municipal water purification or sewage treatment plant to the location of a private well or septic tank. In other words, the province of sanitation extends from simple inspections to technical engineering procedures.

For the most part, State[3] concern is centered primarily in the routine control of public water supplies and sewerage systems, with secondary consideration for those of a semipublic or private nature. At the same time, industrial wastes receive particular attention when they represent a source of stream pollution. The health department is the official agency having major responsibility, but in nearly three-fourths of the jurisdictions one or more other units of State government collaborate with the health department on special features of the program. For instance, several departments of labor participate in the regulation of industrial water supplies and sewerage systems; school sanitation is sometimes the joint concern of the departments of education and health; a number of State universities cooperate with the health department in training operators of water and sewage treatment plants; and special sanitary water boards or commissions supplement services of the health department in prevention of stream pollution. Divided control obtains to a greater degree in the field of sewerage than in the regulation of water supplies.

[3] The term "State" as used in the discussion which follows includes the States, the Territories, the District of Columbia, and the Virgin Islands.

TABLE 1.—*Official State agencies participating in the sanitary control of water supplies and sewage disposal facilities in each State and Territory, the District of Columbia, and the Virgin Islands**

State or Territory	Department of State government								
	Health	Agriculture	Labor	Education	Independent State laboratory	State university or college	Independent department of engineering, public utilities, etc.	State water board or commission, State sanitary authority, etc.	Other
Alabama	X			X					
Arizona	X				X				
Arkansas	X								
California	X		X			X			
Colorado	X		X			X			
Connecticut	X			X				X	
Delaware	X								
District of Columbia	X						X		X
Florida	X					X			
Georgia	X								
Idaho [a]	X								
Illinois	X					X		X	X
Indiana	X								X
Iowa	X	X				X			
Kansas	X					X			
Kentucky	X								
Louisiana	X					X			X
Maine [a]	X						X		
Maryland	X		X						
Massachusetts	X		X			X			
Michigan	X		X	X				X	
Minnesota	X		X			X			
Mississippi	X				X				
Missouri	X					X			
Montana	X								
Nebraska	X								
Nevada	X					X			
New Hampshire	X		X	X					
New Jersey	X		X			X		X	
New Mexico	X							X	
New York	X		X	X		X		X	
North Carolina	X								
North Dakota	X				X				
Ohio	X								X
Oklahoma	X			X		X		X	
Oregon	X					X		X	
Pennsylvania	X			X				X	
Rhode Island	X		X						
South Carolina	X								
South Dakota	X	X						X	
Tennessee	X					X			X
Texas	X			X					
Utah	X								
Vermont	X								
Virginia	X	X		X					
Washington	X		X				X		X
West Virginia	X							X	
Wisconsin	X					X		X	
Wyoming	X			X					
Alaska	X								
Hawaii	X								
Puerto Rico	X								
Virgin Islands	X								

*Any differences between information presented in this table and corresponding entries in table 1, ch. I, of this series are the result of further refinement of the data since publication of the initial article.

[a] The department of health is really a division (Idaho) and bureau (Maine) of public health, subordinate to the department of public welfare (Idaho) and the department of health and welfare (Maine).

Table 1 identifies the State agencies which contribute in any way to the sanitary control of water supplies or sewerage systems, irrespective of whether the character of such facilities is public, semipublic, or private. However, this tabulation does not distinguish between the agency chiefly accountable and those rendering service of an auxiliary nature. Such information may be obtained from table 2.

This second table is designed to summarize precise functions of the various State agencies participating in sanitary supervision of all types of water supplies and sewerage facilities. The code system used for identification of agencies engaged in specific activities is explained at the end of the table. Not only does this tabulation emphasize variations among the several States, but it also highlights differences within a single State in its concern for the three classes of facilities, public, semipublic, and private.

Uncontrolled sources of drinking water and heterogeneous methods of sewage disposal have given rise to many health problems. Certain aspects of these problems have been selected for regulatory control among State agencies which seek correction of environmental conditions hazardous to health. Without exception, some regulatory power over water supplies and sewerage systems has been delegated to each State health department, but extent of authority varies according to the classification of facilities. Health departments have what may be regarded as exclusive regulatory jurisdiction over municipal water supplies, except in the District of Columbia and Maine where an independent department of engineering and a department of public utilities, respectively, operate for this purpose. When regulation of the treatment and disposition of municipal sewage is involved, however, the health department authority of 10 States is reinforced by extended power given to especially created sanitary water boards, commissions, or authorities which exist for the sole purpose of controlling, preventing, and abating pollution of bodies of water. As a rule, the health department is the active agent for these special sanitation groups which generally consist of ex-officio membership and function largely for purposes of fact-finding or regulation.

The specific items covered by the regulatory functions of State health departments with respect to municipal water supplies and sewage disposal are not always the same. Some which are more frequently included pertain to elimination of cross connections, submission of plans prior to construction or extension of facilities, requirement of plant operating records, establishment of training standards for operators of public water supply systems and sewage treatment plants, laboratory checking of adequacy of treatment, and methods of preventing stream pollution.

TABLE 2.—*Department of State government* responsible for specific activities designed to control sanitation of water supplies and sewerage systems in each State and Territory, the District of Columbia, and the Virgin Islands*

Activity	State or Territory							
	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia
Promulgates and/or enforces State laws, rules, and regulations governing water supplies and sewage disposal facilities of:								
Municipalities	1	1	1	1	1	1, 8 [b]	1	7, 9
Schools	1, 4	1	1	1	1, 3	1, 4 [b]	1	1 [b], 7, 9
Industries	1	1	1	1 [b], 3 [c]	1, 3	1, 8 [b]	1	1 [b], 7, 9
Camps, roadside parks, and comfort stations	1	1	1	1, 3	1, 3	1	1	1 [b], 7, 9
Private premises	1 [b]	------	1 [b]	1 [b]	1 [d]	1	1 [b]	1, 7, 9
Promotes local programs of control (including W. P. A. projects for constructing privies and septic tanks and for repairing wells)	1	1	1	1	1	1 [e]	1 [b]	------
Conducts educational programs in water supply and sewage disposal for:								
The general public	1	1	1	1	1	1	1	1 [b]
Operators of public water systems and sewage treatment plants	1	------	1	1, 6	1, 6	1	------	7 [b]
Supervises and/or provides consultation service to local organizations (including W. P. A. projects for constructing privies and septic tanks and for repairing wells)	1	1	1	1	1	1 [e]	1	------
Distributes and/or administers financial grants-in-aid to local health units for sanitation activities	1 [f]	1 [f]	1 [f]	1 [f]	1 [f]	1 [f]	------	------
Operates a direct service program:								
Approves plans for public water supplies (including treatment plants) and sewerage installations or extensions	1	(g)	1	1 [b g]	1	1, 8 [b]	1	7 [b]
Inspects public water supplies and sewerage systems—								
Periodically	------	1 [b]	1 [b]	------	1 [b]	1	1 [e]	7 [b]
Routinely, but not at regular intervals	1	1 [e]	1 [c]	1	1 [e]	------	1 [b]	1 [b] 7 [c]
Upon request or complaint only	------	------	------	------	------	------	------	------
Provides laboratory service for testing safety of water from public supplies, adequacy of sewage treatment by public plants, and/or degree of stream pollution	1	5 [e]	1	1	1	1	1 [e]	1
Licenses or certifies operators of public water systems and sewage treatment plants	------	------	1 [g]	------	------	1	------	------
Approves plans for installations of water supplies and sewage disposal facilities of semipublic places (camps, industries, schools, other institutions, etc.)	------	------	1	1 [d]	1	1 [b] 8 [b h]	1	1, 7
Inspects semipublic water supplies and sewage disposal facilities—								
Periodically	------	------	------	------		1 [e h]	1 [e]	------
Routinely, but not at regular intervals	------	------	1 [e]	1 [e]	1 [b] 3 [b]	1 [b h]	1 [b]	------
Upon request or complaint only	1 [b]	1 [b]	------	1 [b] 3 [b]	1 [e]	------	------	1 [b] 7 [b]
Makes laboratory tests of water samples from semipublic supplies	------	------	1	1	1 [k]	1 [b]	1	------
Condemns and closes to use unsatisfactory semipublic supplies	------	------	1	1	1	1 [h]	------	------
Inspects private water supplies and sewage disposal facilities—								
Periodically	------	------	------	------	------	------	------	1 [e]
Routinely, but not at regular intervals	------	------	------	------	------	------	------	------
Upon request or complaint only	------	1	1 [e]	1	1	------	1	1 [b]
Makes laboratory tests of water samples from private supplies	------	5 [k]	------	1	1 [k]	1 [k]	1 [k]	1
Engages in activities to control stream pollution from—								
Municipal sewage	------	1	1	1	1	1, 8	1 [d]	7
Mine drainage	------	1	1	1	1 [d]	------	------	------
Industrial waste	------	1	1	1	------	8	------	7
Other and/or unspecified sewage or waste	1 [d]	------	1	1	------	8	------	7
Furnishes direct advisory service to individuals, corporations, and municipalities as to construction and maintenance of most suitable type of water supply or sewerage system	1, 4 [b]	1	1	1	1	1	1	1
Renders additional service not covered in this classification	1	------	1	1	1	1	1	1

See Code at end of table.

TABLE 2.—*Department of State government responsible for specific activities designed to control sanitation of water supplies and sewerage systems in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Florida	Georgia	Idaho [a]	Illinois	Indiana	Iowa	Kansas	Kentucky
Promulgates and/or enforces State laws, rules, and regulations governing water supplies and sewage disposal facilities of:								
Municipalities	1	1	1	1 [c], 8 [b]	1, 9 [b]	1	1	1
Schools	1	1	1	1 [e], 8 [b]	1	1 [d]	------	1
Industries	1	1	1	1 [e], 8 [b]	1, 9 [b]	1 [d]	1	1
Camps, roadside parks, and comfort stations	1	1	1	1 [c], 8 [b]	1	1 [d], 2	1	1
Private premises	1	1	1	1 [e], 8 [b]	------	1 [d]	------	1 [b]
Promotes local programs of control (including W. P. A. projects for constructing privies and septic tanks and for repairing wells)	1	1	------	1 [d], 8 [b]	1	1	1	1
Conducts educational programs in water supply and sewage disposal for.								
The general public	1	1	1	1	1	1	1	1
Operators of public water systems and sewage treatment plants	1, 6 [b]	1	1	1, 6	1	1, 6	1, 6	1 [e]
Supervises and/or provides consultation service to local organizations (including W P. A projects for constructing privies and septic tanks and for repairing wells)	1	1	1	1, 8 [b]	1	1	1	1
Distributes and/or administers financial grants-in-aid to local health units for sanitation activities	1 [f]	1 [f]	1 [f]	------	1 [f]	1 [f]	1 [f]	1 [f]
Operates a direct service program:								
Approves plans for public water supplies (including treatment plants) and sewerage installations or extensions	1	1	1	1 [c], 8 [b]	1	1	1	1
Inspects public water supplies and sewerage systems—								
Periodically	------	------	1	1 [b]	1 [b]	1 [b]	1 [b]	1
Routinely, but not at regular intervals	1	1	------	1 [c]	1 [e]	1 [c]	1 [e]	------
Upon request or complaint only	------	------	------	------	------	------	------	------
Provides laboratory service for testing safety of water from public supplies, adequacy of sewage treatment by public plants, and/or degree of stream pollution	1	1	1	1	1 [i]	1, 6	1 [i], 6 [i]	1 [e]
Licenses or certifies operators of public water systems and sewage treatment plants	------	------	------	1	------	------	------	------
Approves plans for installations of water supplies and sewage disposal facilities of semipublic places (camps, industries, schools, other institutions, etc.)	1 [h]	1 [h]	------	1, 8[b] [h]	1	------	1 [h]	1
Inspects semipublic water supplies and sewage disposal facilities—								
Periodically	------	1 [e]	1 [b] [h]	------	------	1 [b] [h]	------	------
Routinely, but not at regular intervals	1 [e]	------	------	1 [e]	1 [e]	{1 [b] [h]; 2 [b]}	------	1
Upon request or complaint only	------	1 [b]	------	1 [b], 8 [b]	1 [b]	1 [e]	------	------
Makes laboratory tests of water samples from semipublic supplies	} 1	1	1	1	1	1 [k], 6 [k]	{1 [i] [k]; 6 [i] [k]}	1
Condemns and closes to use unsatisfactory semipublic supplies	1	1	1	------	1	2	1	1
Inspects private water supplies and sewage disposal facilities—								
Periodically	------	------	------	------	------	------	------	------
Routinely, but not at regular intervals	------	------	------	------	------	------	------	------
Upon request or complaint only	1	1	1 [e]	1	1	1	1 [e]	1
Makes laboratory tests of water samples from private supplies	} 1 [k]	1 [k]	1 [k]	1	1 [k]	1 [k], 6 [k]	{1 [i] [k]; 6 [i] [k]}	1 [k]
Engages in activities to control stream pollution from—								
Municipal sewage	1	------	------	8	1, 9	1	1	1
Mine drainage	------	------	------	8	1, 9	1	1	1
Industrial waste	1	1 [g]	------	8	1, 9	1	1	1
Other and/or unspecified sewage or waste	1	------	1 [g]	8	1, 9	1	1	1
Furnishes direct advisory service to individuals, corporations, and municipalities as to construction and maintenance of most suitable type of water supply or sewerage system	1	1	1	1, 9	1	1	1	1
Renders additional service not covered in this classification	1	1	1	8	1	------	1	1

See Code at end of table.

TABLE 2.—*Department of State government responsible for specific activities designed to control sanitation of water supplies and sewerage systems in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Louisiana	Maine [a]	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri
Promulgates and/or enforces State laws, rules, and regulations governing water supplies and sewage disposal facilities of:								
Municipalities	1	7 [c]	1	1 [e]	1, 8 [b d]	1	1	1
Schools	1	1 [b]	1 [b]	------	4	1	1	1
Industries	1	1	1	3 [e]	3, 8 [b d]	1, 3	1 [b]	1
Camps, roadside parks, and comfort stations	1	1	1	------	1 [b]	1	1	1
Private premises	1	1 [b]	1 [b]	------	1 [b]	1 [b]	1 [b]	1
Promotes local programs of control (including W. P. A. projects for constructing privies and septic tanks and for repairing wells)	1	------	1	1 [e]	1 [e]	1 [e]	1	1
Conducts educational programs in water supply and sewage disposal for:								
The general public	1	1, 7 [e]	1	1	1	1	1	1
Operators of public water systems and sewage treatment plants	1, 6	------	1	1, 6	1	1, 6	1	1, 6
Supervises and/or provides consultation service to local organizations (including W. P. A. projects for constructing privies and septic tanks and for repairing wells)	1	1 [e], 7	1	1 [e]	1 [e]	1 [e]	1	1
Distributes and/or administers financial grants-in-aid to local health units for sanitation activities	1 [f]	------	1 [f]	1 [f]	1 [f]	------	1 [f]	1 [f]
Operates a direct service program:								
Approves plans for public water supplies (including treatment plants) and sewerage installations or extensions	1	1 [g], 7	1	1	1	1	1	1
Inspects public water supplies and sewerage systems—								
Periodically	1 [b]	1 [c], 7 [c]	1	------	1 [b]	------	1	1 [c]
Routinely, but not at regular intervals	1 [e]	1 [b h]	------	1	1 [e]	1 [e]	------	1 [b]
Upon request or complaint only	------	------	------	------	------	1 [b]	------	------
Provides laboratory service for testing safety of water from public supplies, adequacy of sewage treatment by public plants, and/or degree of stream pollution	1	1	1	1	1	1	1, 5	1 [i]
Licenses or certifies operators of public water systems and sewage treatment plants	------	------	------	------	1	------	------	------
Approves plans for installations of water supplies and sewage disposal facilities of semipublic places (camps, industries, schools, other institutions, etc.)	1	1	1 [k]	1 [h]	1	1 [g]	------	1
Inspects semipublic water supplies and sewage disposal facilities—								
Periodically	1 [b h]	1 [h]	------	1 [c]	1 [e]	------	1 [b h]	------
Routinely, but not at regular intervals	1 [e]	1 [h]	1 [e]	------	{1 [b h] 3 [g h]}	------	------	1
Upon request or complaint only	------	------	{1 [b h] 3 [b h]}	1 [h]	------	1	------	------
Makes laboratory tests of water samples from semipublic supplies	1	1	1	1	1	1	------	1 [i]
Condemns and closes to use unsatisfactory semipublic supplies	1		------	1	1	------	------	1
Inspects private water supplies and sewage disposal facilities—								
Periodically	------	------	------	------	------	------	------	------
Routinely, but not at regular intervals	------	1 [b]	------	------	------	------	------	------
Upon request or complaint only	1 [e]	------	1 [e]	1	1 [e]	1 [e]	1 [e]	1
Makes laboratory tests of water samples from private supplies	1 [k]	1 [k]	1 [k]	1 [k]	1 [k]	1 [k]	1 [k]	1 [i k]
Engages in activities to control stream pollution from—								
Municipal sewage	1	7 [d]	1	------	1, 8	1	1	1 [k]
Mine drainage	------	------	1	------	1, 8	------	------	------
Industrial waste	9	7 [d]	1	------	1, 8	1	1	------
Other and/or unspecified sewage or waste	9	7 [d]	------	1 [d]	1, 8	1	------	------
Furnishes direct advisory service to individuals, corporations, and municipalities as to construction and maintenance of most suitable type of water supply or sewerage system	1	1, 7	1	1	1	1	1	1
Renders additional service not covered in this classification	1	1	1	1	1	1	1	1

See Code at end of table.

Table 2.—*Department of State government responsible for specific activities designed to control sanitation of water supplies and sewerage systems in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina
Promulgates and/or enforces State laws, rules, and regulations governing water supplies and sewage disposal facilities of:								
Municipalities	1	1	1	1	1, 8[b d]	1, 8[b d]	1, 8[b d]	1
Schools	1[d]	1[d]	1	1, 4	1[d]	1	1[b], 4	1
Industries	1[d]	1[e]	1	1	{1[b d], 3[c] 8[b d]}	1, 8[b d]	{1[b], 3[e] 8[b d]}	1
Camps, roadside parks, and comfort stations	1[d]		1	1	1[d]	1	1	1
Private premises	1[b d]		1[b]	1[b]	1[d]	1[b]	-	1
Promotes local programs of control (including W. P. A. projects for constructing privies and septic tanks and for repairing wells)	-	1	1		1	1	1[e]	1
Conducts educational programs in water supply and sewage disposal for:								
The general public	1	1	1	1	1	1	1	1
Operators of public water systems and sewage treatment plants	1	- -	1[c]	1	6	- -	1, 6	1
Supervises and/or provides consultation service to local organizations (including W. P. A. projects for constructing privies and septic tanks and for repairing wells)	1	1	1	1[e]	1	1	1[e], 4[c]	1
Distributes and/or administers financial grants-in-aid to local health units for sanitation activities	-			- -	1[f]	1[f]	1[f]	1[f]
Operates a direct service program:								
Approves plans for public water supplies (including treatment plants) and sewerage installations or extensions	1	1	-----	1	1	1	1	1
Inspects public water supplies and sewerage systems—								
Periodically	1[b]	1	-	- -	1[b]	1[b]	1	
Routinely, but not at regular intervals	1[c]		1	1[e]	1[e]	1[c]		1
Upon request or complaint only			-	1[b]	---			
Provides laboratory service for testing safety of water from public supplies, adequacy of sewage treatment by public plants and/or degree of stream pollution	1	1[c]	1, 6	1	1	1	1	1[e]
Licenses or certifies operators of public water systems and sewage treatment plants		------	--	-- ---	1	-	1	
Approves plans for installations of water supplies and sewage disposal facilities of semipublic places (camps, industries, schools, other institutions, etc.)	1[h]	1[b d]	1	1	---- -	-----	1	1
Inspects semipublic water supplies and sewage disposal facilities—								
Periodically	1[b h]	- -	1[h]	1[h]	-----	---		
Routinely, but not at regular intervals	-- --		-	{3[b h] 4[b h]}	1[c]	1	1[c]	1[b]
Upon request or complaint only	1[c]	1[b h]	1[b h]	--	1[b d]	1[c]	1[b]	1[e]
Makes laboratory tests of water samples from semipublic supplies	1[k]	---	1	1	1	-	1	1[k]
Condemns and closes to use unsatisfactory semipublic supplies	1		1	1	1	1	1	1
Inspects private water supplies and sewage disposal facilities—								
Periodically					- ----		-	-
Routinely, but not at regular intervals	-	-				---		-
Upon request or complaint only	1[e]	1[c]	1	1[b]	1	1[c]	1[b]	1
Makes laboratory tests of water samples from private supplies	1[k]	1[k]	1[k]	1	1[k]	-----	-----	1[k]
Engages in activities to control stream pollution from—								
Municipal sewage	1	- --	----	1	8	1	1, 8	1
Mine drainage	1	----	-----	- -	8	8[d]	--	1
Industrial waste	1	----	------	1	8	8[d]	1, 8	1
Other and/or unspecified sewage or waste	1	----	------	1	--------	--------	1, 8	1
Furnishes direct advisory service to individuals, corporations, and municipalities as to construction and maintenance of most suitable type of water supply or sewerage system	1	1	1	1	1	1	1	1
Renders additional service not covered in this classification	1	1	1	1	1	1	1	1

See Code at end of table.

TABLE 2.—*Department of State government responsible for specific activities designed to control sanitation of water supplies and sewerage systems in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota
Promulgates and/or enforces State laws, rules, and regulations governing water supplies and sewage disposal facilities of								
Municipalities	1	1	1	1, 8[b,d]	1 8[b]	1	1	1
Schools	1	1	1 4	1 8[b,d]	1 4[b]	1	1	1
Industries	1	1	1 8	1 8[b,i]	1 8[b]	1 3[e]	1	8[b,d]
Camps, roadside parks, and comfort stations	1 5[e]	1[e]	1	1	1	1	1	2
Private premises	1[b]		1	1[i]	1[d]	1		---
Promotes local programs of control (including W P A projects for constructing privies and septic tanks and for repairing wells)	1	1[e]	1	1	1		1	1
Conducts educational programs in water supply and sewage disposal for								
The general public	1	1	1	1	1	1	1	1
Operators of public water systems and sewage treatment plants	1	1	1 6	1 6			1	1
Supervises and/or provides consultation service to local organizations (including W P A projects for constructing privies and septic tanks and for repairing wells)	1	1[e]	1	1	1	1	1	1
Distributes and/or administers financial grants in aid to local health units for sanitation activities	1[f]	1[f]	1[f]	1[f]			1[f]	1[f]
Operates a direct service program								
Approves plans for public water supplies (including treatment plants) and sewerage installations or extensions	1	1	1	1 8[b,d]	1	1[b]	1	1
Inspects public water supplies and sewerage systems—								
Periodically	1	1[b]				1[b]	1	
Routinely, but not at regular intervals			1	1, 8[b,d]	1	1[e]		1[e]
Upon request or complaint only		1[e]						1[i]
Provides laboratory service for testing safety of water from public supplies, adequacy of sewage treatment by public plants, and/or degree of stream pollution	1	1[e]	1	1[e] 6[e]	1	1	1[e,j]	1
Licenses or certifies operators of public water systems and sewage treatment plants		1	1[e,g]					-
Approves plans for installations of water supplies and sewage disposal facilities of semipublic places (camps, industries, schools, other institutions, etc)	1	1[h]		1[h]	1[h]		1[b]	1[h]
Inspects semipublic water supplies and sewage disposal facilities—								
Periodically		1[h] 9[e]		1[e]	1[h]	1[e]	1[b]	
Routinely, but not at regular intervals	1[e] 5[e]				1[b,b]	1[b]		
Upon request or complaint only	1[b]	1[b,h]	8[b,h]	8[b,h]				1[h], 2[b,h]
Makes laboratory tests of water samples from semipublic supplies	1 5	1	- -	1	1	1	1	1
Condemns and closes to use unsatisfactory semipublic supplies		1[h]	---	1	1	1	-	- ---
Inspects private water supplies and sewage disposal facilities—								
Periodically	-	--		------	-			-
Routinely, but not at regular intervals		----		---	-	1[b]		
Upon request or complaint only	1	----	1[b]	1	1	1[e]	1	1
Makes laboratory tests of water samples from private supplies	1[k]			1[k]	1	1[k]	1[k]	1[k]
Engages in activities to control stream pollution from—								
Municipal sewage	1	1	1	8	1, 8	1	1	1, 8
Mine drainage	1	1	8	8		1		1 8
Industrial waste	1	1	1, 8	8	1, 8	1	1	1, 8
Other and/or unspecified sewage or waste	1	1	1, 8	8	---	1	1	-------
Furnishes direct advisory service to individuals, corporations, and municipalities as to construction and maintenance of most suitable type of water supply or sewerage system	1	1	1	1	1	1	1	1
Renders additional service not covered in this classification	1	1	1	--------	1	1	1	1

See Code at end of table.

TABLE 2.—*Department of State government responsible for specific activities designed to control sanitation of water supplies and sewerage systems in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin
Promulgates and/or enforces State laws, rules, and regulations governing water supplies and sewage disposal facilities of.								
Municipalities	1	1	1	1	1	{1, 7[e,d] 9[b]}	1, 8[b,d]	1, 8[b,d]
Schools	------	1	1	1	1[b], 4[e]	1	1	1
Industries	1[b], 9[b]	1	1	1	1	1, 3[e]	1, 8[b,d]	1, 8[b,d]
Camps, roadside parks, and comfort stations	9	1	1	1	1	1	1	1
Private premises	------	1	1[b]	1[e]	1	1[d]	1	1
Promotes local programs of control (including W. P. A. projects for constructing privies and septic tanks and for repairing wells)	1	1	1	1[e]	1	1	1	1
Conducts educational programs in water supply and sewage disposal for:								
The general public	1	1	1	1	1	1	1	1
Operators of public water systems and sewage treatment plants	1, 6[e]	1, 4	------	------	1	1	1	1, 6
Supervises and/or provides consultation service to local organizations (including W. P. A. projects for constructing privies and septic tanks and for repairing wells)	1	1	1	1[e]	1	1	1	1
Distributes and/or administers financial grants-in-aid to local health units for sanitation activities	1[f]	1[f]	1[f]	------	1[f]	1[f]	1[f]	1[f]
Operates a direct service program:								
Approves plans for public water supplies (including treatment plants) and sewerage installations or extensions	1	1	------	1	1[e,g]	1	1	1
Inspects public water supplies and sewerage systems—								
Periodically	1	------	1[b]	------	------	------	------	1[e]
Routinely, but not at regular intervals	------	1[e]	1[e]	1	1	1	1	1
Upon request or complaint only	------	1[b]	------	------	------	------	------	------
Provides laboratory service for testing safety of water from public supplies, adequacy of sewage treatment by public plants, and/or degree of stream pollution	1	1	1[e]	1[e]	1[e]	1	1	1
Licenses or certifies operators of public water systems and sewage treatment plants	1[e,g]	1	------	------	------	------	1	------
Approves plans for installations of water supplies and sewage disposal facilities of semipublic places (camps, industries, schools, other institutions, etc.)	------	1	------	1	1[g]	1[k]	1	------
Inspects semipublic water supplies and sewage disposal facilities—								
Periodically	------	------	------	------	1[e]	------	------	1[e,h]
Routinely, but not at regular intervals	------	1[e]	1	1[b]	1[b]	------	1[b,h]	------
Upon request or complaint only	1[b,h]	1[b]	1	1[e]	------	1	1[e]	1[b]
Makes laboratory tests of water samples from semipublic supplies	------	1	1	1	1	1[k]	1	1
Condemns and closes to public use unsatisfactory semipublic supplies	------	1	------	1	------	1	1	1
Inspects private water supplies and sewage disposal facilities—								
Periodically	------	------	------	------	------	------	------	------
Routinely, but not at regular intervals	------	------	------	------	------	------	------	------
Upon request or complaint only	------	1[e]	1[b]	1[e]	1	1	------	1
Makes laboratory tests of water samples from private supplies	------	1[k]	------	1[k]	1[k]	1[k]	1	1[k]
Engages in activities to control stream pollution from—								
Municipal sewage	1	1	1	------	------	1, 9	1, 8	1, 8
Mine drainage	------	1	1	------	------	------	1, 8	1, 8
Industrial waste	1	1	1	------	------	1, 9	1, 8	1, 8
Other and/or unspecified sewage or waste	------	1	1	1[g]	1[d,g]	------	1, 8	1, 8

See Code at end of table.

TABLE 2.—*Department of State government responsible for specific activities designed to control sanitation of water supplies and sewerage systems in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin
Operates a direct service program—Con								
Furnishes direct advisory service to individuals, corporations, and municipalities as to construction and maintenance of most suitable type of water supply or sewerage system	1	1	1	1	1	1	1	1
Renders additional service not covered in this classification	------	1	1	1	1, 2	1	1	1

Activity	State or Territory				
	Wyoming	Alaska	Hawaii	Puerto Rico	Virgin Islands
Promulgates and/or enforces State laws, rules, and regulations governing water supplies and sewage disposal facilities of					
Municipalities	1	1	1	1	1
Schools	1, 4 [b]	1	1	1	1
Industries	1	1	1	1	1 [b]
Camps, roadside parks, and comfort stations	1	-------	1	1	1 [b]
Private premises	1 [b]	1 [b]	1 [b]	1	1 [b]
Promotes local programs of control (including W. P A projects for constructing privies and septic tanks and for repairing wells)	1	1 [a]	1 [a]	1	-------
Conducts educational programs in water supply and sewage disposal for:					
The general public	1	1	1	1	1
Operators of pubic water systems and sewage treatment plants	-------	-------	1	1 [c]	------
Supervises and/or provides consultation service to local organizations (including W. P. A. projects for constructing privies and septic tanks and for repairing wells)	1	1 [a]	1 [a]	1	1 [a]
Distributes and/or administers financial grants-in-aid to local health units for sanitation activities	-------	-------	1 [f]	1 [f]	-------
Operates a direct service program:					
Approves plans for public water supplies (including treatment plants) and sewerage installations or extensions	1	1	1	1	-------
Inspects public water supplies and sewerage systems—					
Periodically	1	1	1 [c]	1 [b]	-------
Routinely, but not at regular intervals	-------	-------	1 [b]	1 [c]	-------
Upon request or complaint only	-------	-------	-------	-------	-------
Provides laboratory service for testing safety of water from public supplies, adequacy of sewage treatment by public plants, and/or degree of stream pollution	1	1	1	1 [c]	1 [c]
Licenses or certifies operators of public water systems and sewage treatment plants	-------	-------	-------	-------	-------
Approves plans for installations of water supplies and sewage disposal facilities of semipublic places (camps, industries, schools, other institutions, etc.)	1	-------	1	1	-------
Inspects semipublic water supplies and sewage disposal facilities—					
Periodically	1 [a]	1 [b]	-------	-------	-------
Routinely, but not at regular intervals	1 [b]	-------	1 [b]	1	1 [c]
Upon request or complaint only	-------	1 [b h]	-------	-------	1 [b]
Makes laboratory tests of water samples from semipublic supplies	1	1	1	1	1 [k]
Condemns and closes to use unsatisfactory semipublic supplies	1	1	1	-------	-------

See Code at end of table.

Table 2.—*Department of State government responsible for specific activities designed to control sanitation of water supplies and sewerage systems in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory				
	Wyoming	Alaska	Hawaii	Puerto Rico	Virgin Islands
Operates a direct service program—Continued					
Inspects private water supplies and sewage disposal facilities—					
Periodically					--
Routinely, but not at regular intervals	-				--
Upon request or complaint only	1	1	1	1	1
Makes laboratory tests of water samples from private supplies	1 [k]	1 [k]	1 [k]		1 [k]
Engages in activities to control stream pollution from—					
Municipal sewage	1	1 [l]	1	1	
Mine drainage	1	1 [l]			
Industrial waste	1	1 [l]	1	1	
Other and/or unspecified sewage or waste		1 [l]	1	1	
Furnishes direct advisory service to individuals, corporations, and municipalities as to construction and maintenance of most suitable type of water supply or sewerage system	1	1	1	1	
Renders additional service not covered in this classification	1	1	1	1	

*Code

1 Department of health
2 Department of agriculture
3 Department of labor, labor and industry, labor and statistics, industrial commission, etc
4 Department of education, public instruction, etc
5 Independent State laboratory, State laboratory department
6 State university or college
7 Independent department of engineering, department of public utilities, department of public service
8 State water commission, State water board, stream control commission, sanitary water board, State sanitary authority, committee of water pollution, interstate stream commission etc
9 Other departments or offices of State government

[a] The department of health is really a division (Idaho) and bureau (Maine) of public health, subordinate to the department of public welfare (Idaho) and the department of health and welfare (Maine)
[b] Sewage disposal facilities only
[c] Water supplies only
[d] Under special conditions only When water supplies are endangered, when stream pollution is involved when cross connections are concerned, when nuisances are created, when shellfish-producing waters are involved, in case of actual or threatened disease, if more than a specified number of persons is served in the absence of local service, and/or if municipal facilities are privately owned
[e] For general sanitation activities, but not for W P A community sanitation projects
[f] As part of grant-in-aid to local health units for general health work
[g] Not required, but a voluntary activity, no regulatory authority, but promotional and advisory activity
[h] For selected types of facilities only Tourist and/or C C C camps, roadside supplies dairy farms, institutions, schools, industries, new plants, approved facilities, and/or other selected types or groups of facilities
[i] Service provided, but on a fee basis
[j] Laboratory of the State health department makes only bacteriological examinations, chemical analyses, which are required quarterly, must be made by private chemists
[k] Upon request or complaint, occasionally, for special studies, and/or for verification of local findings
[l] Has authority, but little or no activity carried on

Sanitation of semipublic water and sewerage systems usually falls within the scope of State authority also, but the health department is less apt to have full regulatory power over semipublic facilities than over those classified as public, or municipal. Not only do special sanitary commissions or water boards and the independent department of engineering which have already been referred to share responsibility for control of semipublic sewerage systems, but nine departments of education participate in regulation of school sanitation and as many departments of labor promulgate and/or enforce regulations pertaining to sanitation within industrial establishments.

Nevertheless, this amount of split control does not alter the fact that the health department maintains the leading regulatory position with respect to sanitation of water and sewerage facilities of schools, industries, hospitals and other institutions, camps, roadside parks, and the like. In some States, authority over semipublic facilities does not include both the water supply and the sewerage system but is limited to one or the other. Furthermore, State intervention may be restricted to special conditions such as the endangering of public water supplies, creation of a nuisance, involvement of stream pollution, or service affecting more than a specified number of persons. From table 2 may be determined the States and the agencies which have limited and broad regulatory authority over the several types of semipublic facilities.

Relatively little State regulatory control is maintained over the water supplies and sewage disposal facilities of private premises. Actually, less than one-third of the States routinely have such control over both types of facilities. Conversely, 10 States report no regulation whatever; in 21, the regulatory function as applied to private premises is limited to methods of sewage disposal; and in 5, State regulation applies to special conditions only.

All State health departments having local counterparts engage in promotional activities for extension of sanitation services at that level. Stimulation of local endeavors is accomplished largely through furnishing supervision and advice to sanitation personnel affiliated with the local health organizations. This is a particularly important function of the State health department engineers. Direct promotional and educational measures which members of the State staff rely upon as effective approaches to the problem of sanitation fall into two distinct categories. One type of educational activity is designed for the general public, while the other includes more specialized instruction for operators of water systems and sewage treatment plants. Conferences with local officials, lectures before service clubs and citizens' associations, and distribution of pertinent literature are the means usually selected for securing installation of new or extension of old facilities. Furnishing suggestions, assistance, and cooperation in the development of new public water supplies and sewerage facilities also constitutes a major health department function.

The general promotional and educational efforts of State health departments are not limited to facilities classified as public. In rural areas public installations are impossible or impractical and individual facilities must be maintained. To meet such needs, the health department circulates standards and specifications which are recommended for springs, wells, and surface water supply systems as well as corresponding information regarding installation of septic tanks or sanitary privies for use on semipublic or private premises. One of

the outstanding promotional enterprises of State health departments is sponsorship of community sanitation projects conducted by the Federal Work Projects Administration and including construction and repair of privies, septic tanks, and wells. Such sponsorship entails defining the work proposed, outlining procedures to be followed, securing orders, determining personnel required, estimating total and unit costs, and attending to such other details as might be necessary for securing approval by the Work Projects Administration. In other words, the State health department is the motivating force behind the cooperating agency which renders the actual direct service.

The functioning of water and sewage treatment plants cannot be considered either satisfactory or safe unless competent personnel are employed for their operation. Nevertheless, only about one-fifth of the State health departments have any control—through licensing, certification, or establishment of standards of training—over the qualifications of persons serving in this capacity. Consequently, the knowledge and ability of plant operators varies considerably according to differences in requirements set up by the individual cities. In an effort to level off these inequalities, about four-fifths of the State health departments have undertaken some sort of in-service training for operators of water and sewage treatment plants who may be inadequately prepared for their task. Such training may be restricted to personal instruction given by engineers of the State health department at individual conferences which usually follow their periodic investigation of the plant operation, or it may be supplemented by short group courses conducted by the health department either independently or in cooperation with the State university. Attendance at these short courses is largely on a voluntary basis. Other types of in-service training sponsored by several States each are regional conferences, traveling schools held at selected points throughout the State, home study courses, and apprenticeship training.

No financial grants-in-aid are made to local health units specifically for water and sewerage activities; yet almost without exception some portion of the allotment made by a State health department to local units for general health work is expended for salaries of local engineers or sanitarians, who, in turn, are directly working for improvement of existing water and sewerage systems and for installation of additional new systems.

Direct service rendered by State agencies for water safety and proper sewage disposal, as well as regulatory control exercised over these features, varies according to the several types of facilities. Activities classified as direct State service for municipal systems may be described according to one or a combination of the following categories: (1), Technical review and approval of source of public water supplies and of construction plans for installation and extension of public water and

sewage treatment plants and systems; (2), inspection of plant operation; (3), laboratory testing of samples to determine safety of water and adequacy of sewage treatment; and (4), licensing or certification of plant operators. For the most part, the health department is the direct service agent of the State, but all branches of service are not performed with the same degree of uniformity.

Since the safety of public water supplies and sewage treatment is dependent upon provision of special structures, mechanical equipment, and treatment chemicals, staff engineers of all but 10 State health departments routinely examine in detail plans for both water and sewage treatment plants and systems prior to their installation or extension. Two more health departments render such service for municipal sewage disposal facilities only and 1, for water supplies only; 4 do not require that engineering plans and specifications be submitted for review, but make complete checks when they are voluntarily presented. In 3 States, the sanitary water board, State water commission, or similar organization supplements health department service in review and approval of plans for sewer systems and treatment plants, while an independent department of engineering and a department of public utilities function in this capacity in 1 State each.

Periodic inspectional service provided by the State agencies for municipal water and sewerage facilities ranges from weekly to biennial visits, with more than one-fourth of the States reporting that investigations of both types of facilities are made routinely, but at irregular intervals. Source material collected in connection with this survey does not reveal specific items covered in the inspections made by State engineers, but suggests that details of such investigations vary in accordance with complexity of the system or treatment plant under observation.

Practically all States provide laboratory service for checking the safety of water from public supplies. This is usually a health department performance, but in a few States maintenance of the public health laboratory is a joint function of the health department and State university or college. In two more jurisdictions an independent State laboratory affords facilities for testing the safety of water samples from municipal systems. Laboratory testing of the adequacy of sewage treatment is less uniformly practiced by State agencies, inasmuch as a fourth of the States report the absence of such service. It should be noted that three of the States which test municipal water and sewage samples do so only on a fee basis. In the remaining States listed such service is free.

Licensing of plant operators is a form of direct service which is very closely allied with the regulatory function of the agency. Although a few State health departments have initiated licensing sys-

tems through a voluntary certification plan, in the majority of States this procedure is carried out in accordance with specific statutory requirements.

While the types of direct service afforded semipublic water supplies and sewage disposal systems by State agencies are similar to those provided public facilities, the extent of such service varies markedly for the two classes of installations. The semipublic group, it will be recalled, includes camps, roadside recreation parks, comfort stations, schools, industries, hospitals, or other like institutions not connected with a public water supply or sewer system. As a rule, such water supplies are obtained from untreated springs or wells, and septic tanks are used as the means of sewage disposal. Twenty-two States report routine review and approval of construction plans for all kinds of semipublic water or sewerage systems. In 13 additional areas, such service is available for particular kinds of semipublic places only. For instance, one health department may check all school specifications, whereas another may concentrate on the water and sewerage of tourist camps. Still another variation of this branch of service is that rendered when plans for semipublic places are submitted voluntarily. Reports of nearly one-fourth of the jurisdictions indicate that no action whatever is taken from the State level upon plans for proposed semipublic water and sewerage installations.

Inspections of semipublic facilities by State personnel are rarely made at stated intervals even in those States which report inclusion of such service as an item of their programs. Irregular inspectional schedules predominate and investigation of semipublic facilities upon request or complaint only is not uncommon. It should be emphasized that absence of periodic State inspectional service does not necessarily imply that no supervision is extended over the water and sewerage of places maintaining their own facilities, but serving groups of people. In general, it is the policy of State health departments to delegate most of such activity to their local subdivisions, thus conserving the time and energies of the State staff for handling municipal problems and especially troublesome semipublic situations. Where there are not organized local health units, however, any supervision which is maintained over semipublic accommodations must necessarily emanate from the State agency.

With one important difference, circumstances under which State laboratory facilities are available for testing water samples from semipublic supplies are much the same as those described for samples collected from municipal sources. The difference referred to occurs in seven States which do not routinely test samples from semipublic supplies, but render such service upon request only. Condemnation of unsatisfactory semipublic supplies and subsequent closing thereof is a practice resorted to by about two-thirds of the health departments.

Practically all direct service pertaining to water supplies and sewage disposal facilities of private premises which is supplied by State personnel to individual families is furnished on a request basis. While both inspectional and laboratory service are included in these requests, direct advisory service consisting primarily of recommended standards and specifications constitute by far the greatest bulk of aid given by State health departments for facilities of private premises. Such direct advisory service is not to be confused with the advisory and supervisory function discussed earlier in this report. The previous item applied to the relationship between State and local engineering personnel rather than to specific advice given individuals regarding the most suitable type of water supply or sewerage system.

Probably the most notable mass effort of State health departments for improvement of environmental sanitation of private premises is their joint participation with the Federal Work Projects Administration and organized local health units in extensive privy construction programs. A few States have expanded this activity to include construction of septic tanks and repair of wells. The actual role of the State health agency in these projects is usually defined as development, promotion, and supervision. Over three-fourths of the health departments reported such participation. Northeastern States are less apt to engage in community sanitation programs of this type than are States of any other section of the country. About two-fifths of the health departments reported a cooperative arrangement with Federal loan agencies whereby the health department approves the water supply and sewage disposal facilities on private properties for which Federal loans are sought.

Additional activities which are closely related to the main problems of water supply and sewage disposal and which are carried on to a varying extent by engineers of the several State health departments include certification of the drinking water used on common carriers and control of the sale of bottled water and water used as a source of ice supplies.

From the foregoing discussion, it is obvious that there is a definite pattern to State activities for safety of water supplies and sewage disposal facilities, not only with respect to content of the program but also from the standpoint of the agency primarily responsible and the types of auxiliary agencies which participate in special features of the complete control plan. That considerable variation obtains among the States in extent and intensity of service is recognized; yet it is significant that in this field of public health endeavor some agreement has been reached as to effective control methods and scope of State responsibility.

PLAGUE INFECTION REPORTED IN THE UNITED STATES DURING 1941

IN HUMAN BEINGS

Two fatal cases of plague in human beings were reported in the United States in 1941, both in Siskiyou County, California. The first case occurred in a 10-year-old boy, residing near Montague, with onset on June 14 and death on June 26. The diagnosis was confirmed bacteriologically. The second case occurred in a 5-year-old boy living 1 mile northwest of Mount Shasta City, about 50 miles from the locality in which the other case occurred. The diagnosis was confirmed by animal inoculation and the isolation of pure cultures.

The source of infection in each case was believed to have been ground squirrels; and the distance between the two localities in which the cases occurred indicated widespread rodent infection in the area. This was subsequently proved to be the case by the finding of plague infection in pools of fleas taken from ground squirrels in various localities in Siskiyou County.

IN RODENTS AND PARASITES

Plague infection in rats, wild rodents, and parasites from rodents was reported during 1941 in 8 western States—California, Colorado, Idaho, Montana, New Mexico, North Dakota, Oregon, and Washington. It was found for the first time in North Dakota. On July 12, 1941, the infection was proved in fleas collected on June 23 from ground squirrels (*C. richardsonii*) shot in a locality about 7 miles northeast of Crosby, Divide County, and about 6 miles south of the Saskatchewan-North Dakota boundary. It is believed that this locality is the farthest east in which plague infection has been found in wild rodents or their ectoparasites in the United States. The farthest east where the infection had previously been proved to be present was Dona Ana County, New Mexico, where an infected kangaroo rat was found in 1939.

Infected rats and infected fleas from rats were found in San Francisco and Richmond, Contra Costa County, California, during the year.

The accompanying table lists the areas in which plague infection was reported to the Public Health Service during 1941. It is not to be inferred that these reports give the complete picture of the presence of the infection among wild rodents in the Western States, as the field forces engaged in the work, the areas included in the investigations, and the seasonal periods during which the work is undertaken are limited. They do, however, demonstrate the continuance of a wide distribution and an expanding area of proved foci.

The presence of infection in animal tissue or parasites was demonstrated by laboratory examination, inoculation of laboratory animals

with tissue from rodents, and mass inoculation with emulsion of parasites.

Plague infection in wild rodents and their ectoparasites as reported to the Public Health Service during 1941

State and county	Date [1]	Infection found in—
California:		
Alameda County	July 2	2 pools of fleas from rats (*R. norvegicus*), in Berkeley and Oakland.
Contra Costa County	May 13	Tissue from 2 rats (*R. norvegicus*) taken on garbage dump in Richmond.
Do	June 24	Pool of fleas from 68 rats taken on garbage dump in Richmond.
Kern County	May 7	Tissue from 2 ground squirrels (*C. beecheyi*).
Do	May 16	Tissue from ground squirrel (*C. beecheyi*) and 3 pools of fleas from ground squirrels.
Do	May 24	3 pools of fleas from ground squirrels (*C. beecheyi*).
Do	May 29	Pool of fleas from ground squirrels (*C. beecheyi*).
Do	June 3	2 pools of fleas from ground squirrels (*C. beecheyi*).
Do	June 11	Pool of fleas from ground squirrels (*C. beecheyi*).
Do	June 18	Pool of fleas from ground squirrels (*C. beecheyi*).
Do	June 20	Tissue from ground squirrel (*C. beecheyi*).
Do	June 26	Pool of fleas from ground squirrel burrows; 2 pools of fleas from ground squirrels (*C. beecheyi*).
Do	June 30	Ground squirrel.
Do	July 2	2 pools of fleas from ground squirrels 6 miles from Davis Ranger Station and ground squirrel from Keene (all squirrels *C. beecheyi*).
Do	July 5	Pool of fleas from 1 ground squirrel found dead 3 miles south of Davis Ranger Station; in ground squirrel from ranch 6 miles south of Davis Ranger Station.
Do	July 9	2 pools of fleas from ground squirrels taken 2 and 6 miles south of Davis Ranger Station; 3 ground squirrels, pool of 36 ticks and pool of fleas from ground squirrels taken near Keene.
Do	July 12	3 ground squirrels and pool of fleas from ground squirrels taken near Keene.
Do	July 18	2 ground squirrels and 3 pools of fleas from ground squirrels (*C. beecheyi*).
Do	July 24	Pool of fleas from ground squirrels (*C. beecheyi*).
Do	Aug. 26	Pool of fleas from ground squirrels (*C. beecheyi*).
Do	Nov. 17	Tissue from ground squirrels (*C. fisheri*).
Los Angeles County	June 26	Pool of fleas from ground squirrel (*C. beecheyi*) from Gorman dump, ½ mile east of Gorman.
Monterey County	May 16	Pool of fleas from ground squirrels from Hunter Liggett Military Reservation, 25 miles southwest of King City.
Do	June 30	7 ground squirrels from Hunter Liggett Military Reservation.
Do	July 2	Pool of fleas from Hunter Liggett Military Reservation.
Do	July 5	3 pools of fleas from Hunter Liggett Military Reservation and pool of fleas from ranch 6 miles west of Jolon.
San Bernardino County	Sept. 17	Pool of fleas and pool of lice (approximately 500) from 1 golden mantled ground squirrel.
San Francisco (city and county).	June 3	Pool of fleas from 2 rats (*R. norvegicus*) caught in the vicinity of the 1200 block of Folsom St., San Francisco.
Do	June 24	A rat (*R. norvegicus*) trapped at 1740 Kirkwood Ave., San Francisco.
Santa Cruz County	July 9	Pool of fleas from ground squirrels taken 6 miles east of Watsonville.
Shasta County	Dec. 2	2 pools of fleas from ground squirrels (*C. douglasii*).
Do	Dec. 31	Pool of fleas from ground squirrels (*C douglasii* and *C. lateralis* sp.).
Siskiyou County	July 24	2 pools of fleas from ground squirrels (*C. douglasii*).
Do	Aug. 8	2 pools of fleas from ground squirrels (*C. douglasii*) and pool of fleas from burrows.
Do	Aug. 19	Tissue from ground squirrel (*C. douglasii*) and pool of fleas from ground squirrels (same sp.).
Do	Aug. 26	3 pools of fleas from ground squirrels (*C. douglasii*).
Do	Sept. 4	Tissue from ground squirrel (*C. douglasii*) and 2 pools of fleas from ground squirrels (same sp.).
Do	Sept. 17	Tissue from 1 ground squirrel (sp. unknown) found dead, and 1 ground squirrel (*C. douglasii*) and 2 pools of fleas from same sp.
Do	Sept. 29	3 pools of fleas from ground squirrels (*C. douglasii*).
Do	Sept. 30	Tissue from ground squirrel (*C. douglasii*).
Do	Oct. 16	Pool of fleas from chipmunks and 3 pools of fleas from ground squirrels (*C. douglasii*).
Do	Oct. 22	Pool of fleas from ground squirrels (*C. douglasii*).
Do	Nov. 17	Pool of fleas from ground squirrels (*C. douglasii*).
Do	Dec. 2	2 pools of fleas from ground squirrels (*C. douglasii*).

[1] Date of reports that infection had been proved.

Plague infection in wild rodents and their ectoparasites as reported to the Public Health Service during 1941—Continued

State and county	Date	Infection found in—
Colorado:		
San Miguel County	July 29	Tissue from ground squirrel (*C. variegatus grammurus*); tissue from 2 marmots (*Marmota flaviventris*); pool of fleas from 5 marmots.
Idaho:		
Canyon County	May 23	Pool of fleas from ground squirrels.
Payette County	May 23	Pool of fleas from ground squirrels.
Ada County	June 3	2 pools of fleas from ground squirrels (*C. mollis* sp.)
Montana:		
Beaverhead County	July 23	Pool of fleas from ground squirrels (*C. columbianus*).
Do	July 29	Pool of fleas from ground squirrels (*C. columbianus*).
Ravalli County	Aug. 4	Tissue from 2 ground squirrels.
New Mexico:		
Valencia County	Sept. 20	2 pools of fleas from prairie dogs (*Cynomys gunnisoni zuniensis*).
North Dakota:		
Divide County	July 12	Fleas from ground squirrels (*C. richardsonii*) shot in a locality about 7 miles northeast of Crosby and about 6 miles south of Canadian border.
Do	July 29	3 pools of fleas from ground squirrels (*C. richardsonii*).
Oregon:		
Malheur County	June 3	Pool of fleas from 1 marmot (*Marmota flaviventris avara*).
Harney County	Aug. 14	Tissue from ground squirrel (*C. oregonus*).
Washington:		
Stevens County	July 29	Tissue from ground squirrel (*C. columbianus*) and pool of fleas from ground squirrels.

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

April 26–May 23, 1942

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended May 23, 1942, the number reported for the corresponding period in 1941, and the median number for the years 1937–41.

DISEASES ABOVE MEDIAN PREVALENCE

Measles.—For the four weeks ended May 23 there were 93,056 cases of measles reported, as compared with 172,184, 44,682 and 61,913 reported cases for the corresponding period in 1941, 1940 and 1939, respectively. While the number of cases was only about 55 percent of last year's figure for this period, it was almost one and one-half times the 1937–41 median incidence, which is represented by the 1939 figure. In the Middle Atlantic, South Atlantic and East South Central regions the disease was considerably less prevalent than it was at this time last year and the numbers of cases were also well below the normal seasonal expectancy, but in all other regions the disease was unusually prevalent, the excesses over the normal seasonal incidence ranging from 20 percent in the East North Central region to more than 7 times the 1937–41 median in the Pacific region.

Meningococcus meningitis.—For the current 4-week period there were 336 cases of meningococcus meningitis reported—the highest number recorded for this period of the year since 1937, when 504 cases were reported for the period corresponding to the current one. The excesses were reported from widely scattered regions, the Atlantic Coast, West South Central and Pacific, and was confined largely to certain States in the regions. Of the total cases, New York reported 71, Maryland 27, Massachusetts 25, Texas 19, California 17, Virginia 16, and New Jersey 16 cases. While the current incidence is considerably above that of recent years, it represents a decline from the preceding 4-week period when 390 cases were reported, which figure will probably represent the highest seasonal incidence as a further decline in cases may be expected during the summer months.

Poliomyelitis.—The poliomyelitis situation was most favorable during the current 4-week period. The number of cases (73) was only slightly above the incidence in 1941, which figure (70 cases) also represents the 1937–41 median incidence for this period. An increase of this disease normally occurs at this season of the year. The current figure represented about a 40-percent increase over the preceding 4-week period, but there was no indication of any unexpected increase in any section.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The incidence of diphtheria (757 cases) reported for the four weeks ended May 23 was less than 90 percent of the incidence during the corresponding period in 1941 and only about 60 percent of the 1937–41 median incidence for this period. In the West South Central region the number of cases stood at about the normal seasonal level but in all other regions the incidence was relatively low.

Influenza.—The number of cases of influenza reported for the country as a whole was also comparatively low, approximately 5,200 cases being reported, as compared with 7,530 cases for this period in 1941, and an average of 5,650 cases in the years 1937–41. All regions except the West South Central and Mountain regions reported a relatively low incidence; in the former region the number of cases was about normal for this season of the year, while in the latter region, the incidence was about 75 percent above the average seasonal incidence.

Scarlet fever.—For the four weeks ended May 23 there were 11,551 cases of scarlet fever reported, as compared with approximately 13,880, 19,800, and 16,000 cases for the corresponding period in 1941, 1940, and 1939, respectively. The incidence was slightly higher in the New England States than might be expected, but in all other regions the numbers of cases were lower than the 1937–41 average figures for this period. For the country as a whole the current incidence was the lowest on record for this period of the year.

Smallpox.—The number of cases of smallpox remained at an unusually low level, the 75 cases reported for the current period being only about 35 percent of the low incidence reported in 1941 (218 cases) and less than 7 percent of the 1937–41 median figure for this period. However, one case was reported from New Hampshire during the week ended May 16, which is the first case of this disease reported from the New England region since July 1939, when 6 cases were reported from Connecticut.

Typhoid fever.—A few more cases of typhoid fever occurred during the current period than were reported for the corresponding period in 1941, but the number (384) was only about 75 percent of the 1937–41 average incidence for this period. The 108 cases occurring in the South Atlantic region represented an increase of approximately 20 percent over the seasonal expectancy in that region, but in all other regions the incidence was relatively low.

Whooping cough.—This disease was also considerably less prevalent during the current period than it was at this time in 1941, approximately 15,000 cases being reported, as compared with approximately 21,000 last year; the number of cases was also about 10 percent below the preceding 4-year average incidence.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the four weeks ended May 23, based on data received from the Bureau of the Census, was 11.5 per 1,000 inhabitants (annual basis). The rate was about 20 percent above that for the corresponding period in 1941, but it was slightly lower than the average rate (11.6) for the years 1939–41.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period Apr. 26–May 23, 1942, the number for the corresponding period in 1941, and the median number of cases reported for the corresponding period, 1937–41

Division	Current period	1941	5-year median	Current period	1941	5-year median	Current period	1941	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	757	856	1,221	5,196	7,530	5,650	93,056	172,184	61,913
New England	27	26	31	5	14	15	9,578	6,623	5,193
Middle Atlantic	112	140	242	41	81	81	12,447	54,701	19,646
East North Central	113	157	278	169	301	444	11,276	52,497	9,189
West North Central	73	77	84	93	118	142	9,969	7,336	5,269
South Atlantic	118	147	177	1,577	2,751	2,012	7,852	27,077	9,119
East South Central	64	68	81	374	343	517	1,635	9,174	6,204
West South Central	158	119	159	1,850	2,701	1,842	6,894	7,589	4,094
Mountain	46	58	58	797	476	453	8,311	4,324	3,956
Pacific	46	64	111	290	745	376	25,094	2,863	3,451
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	336	181	181	73	70	70	11,551	13,832	18,074
New England	48	11	11	3	0	1	1,458	1,206	1,206
Middle Atlantic	97	38	44	8	8	6	3,80[illegible]	4,590	5,371
East North Central	12	22	22	8	6	8	3,208	4,189	6,236
West North Central	11	9	14	4	1	3	1,041	1,141	1,445
South Atlantic	74	45	45	20	16	16	708	718	725
East South Central	25	32	32	13	11	9	372	714	411
West South Central	34	14	19	11	11	11	174	337	337
Mountain	4	2	5	2	5	3	262	335	454
Pacific	31	8	8	4	12	14	526	602	862
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	75	218	1,142	384	377	514	15,291	21,484	[3] 16,819
New England	1	0	0	14	27	20	1,632	1,605	1,478
Middle Atlantic	0	0	0	51	56	59	4,149	3,100	3,353
East North Central	12	59	226	49	38	71	3,615	4,175	3,160
West North Central	9	84	440	19	14	23	475	1,749	805
South Atlantic	8	10	7	108	91	91	1,596	3,225	2,791
East South Central	14	15	28	42	55	54	680	836	681
West South Central	27	14	61	75	53	119	998	1,661	1,642
Mountain	1	8	59	9	18	30	513	1,543	1,075
Pacific	3	28	98	17	25	32	1,633	3,590	2,421

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded.
[3] Four years only (1938–41).

DEATHS DURING WEEK ENDED MAY 30, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended May 30, 1942	Corresponding week, 1941
Data from 87 large cities of the United States:		
Total deaths	7,843	7,729
Average for 3 prior years	7,734	
Total deaths, first 21 weeks of year	184,539	187,920
Deaths per 1,000 population, first 21 weeks of year, annual rate	12.4	12.6
Deaths under 1 year of age	535	469
Average for 3 prior years	472	
Deaths under 1 year of age, first 21 weeks of year	11,784	10,949
Data from industrial insurance companies:		
Policies in force	64,981,793	64,478,825
Number of death claims	11,135	9,717
Death claims per 1,000 policies in force, annual rate	8.9	7.9
Death claims per 1,000 policies, first 21 weeks of year, annual rate	10.0	10.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JUNE 6, 1942

Summary

Each of the nine common communicable diseases included in the following weekly table continued at a favorably low incidence during the current week. As for several weeks past, three of these diseases—influenza, measles, and meningococcus meningitis—are above the 5-year (1937–41) median expectancy, but the incidence of none of these diseases is high.

As compared with the preceding week the number of cases of meningococcus meningitis declined from 81 to 68 (5-year median, 49), and of poliomyelitis from 19 to 17 (5-year median, 36). The number of smallpox cases increased from 34 to 36, but the current incidence is below that for the corresponding period of any prior year. Illinois reported 8 cases, Arkansas 7, and Wisconsin 5.

Of 21 cases of Rocky Mountain spotted fever, 9 cases were reported in the Mountain States, and of 35 cases of endemic typhus fever, 10 cases occurred in Texas, 7 in Georgia, and 6 in Alabama. Two cases were reported in New York.

Other diseases reported during the week include 1 case of leprosy in Texas and 1 case in California, 9 cases of amebic, 200 cases of bacillary, and 89 cases of unspecified dysentery, and 13 cases of tularemia.

The death rate for 88 large cities in the United States for the current week is 11.4 per 1,000 population, as compared with 11.0 for the preceding week and a 3-year (1939–41) average of 11.3. The cumulative rate to date (first 22 weeks) is 12.3 as compared with 12.5 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended June 6, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that although none were reported cases may have occurred

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937-1941	Week ended—		Median 1937-1941	Week ended—		Median 1937-1941	Week ended—		Median 1937-1941
	June 6, 1942	June 7, 1941		June 6, 1942	June 7, 1941		June 6, 1942	June 7, 1941		June 6, 1942	June 7, 1941	
NEW ENG												
Maine	0	0	0			---	113	35	70	3	0	0
New Hampshire	0	0	0	8		--	27	10	10	2	0	0
Vermont	0	1	0				155	85	79	0	0	0
Massachusetts	5	0	2		- -		1 037	1 078	976	4	3	2
Rhode Island	0	1	0				220	3	81	0	0	0
Connecticut	0	0	0	1		1	404	460	149	0	1	0
MID ATL.												
New York	9	24	20	[1] 9	7	6	1,144	3 185	2 150	18	3	5
New Jersey	1	6	7	2	3	4	659	2,295	1,256	3	1	1
Pennsylvania	7	14	17	-			1,044	4 983	1 846	17	3	6
E NO CEN												
Ohio	6	14	15	8	7	13	320	2,414	1 491	0	1	3
Indiana	3	4	4	10		6	111	537	442	0	1	1
Illinois	29	20	28	5	5	11	241	1,260	474	0	1	2
Michigan [2]	3	1	6			1	289	1,434	842	1	1	2
Wisconsin	0	4	3	22	20	23	1 284	1,865	1 219	0	0	0
W NO CEN												
Minnesota	3	2	2	1	----	1	391	17	88	0	0	0
Iowa	1	1	2		-----	2	234	24	177	1	0	0
Missouri	2	1	3	1			172	587	71	0	0	0
North Dakota	0	1	0	1	2	14	15	97	14	0	0	0
South Dakota	1	1	1				27	14	4	0	0	0
Nebraska	0	0	0	2	1	-----	290	9	27	0	0	0
Kansas	1	4	3	9	1	2	214	372	357	2	0	0
SO ATL												
Delaware	0	0	0	---			6	69	36	0	0	0
Maryland [2]	5	1	1		5	2	195	462	129	1	4	1
Dist of Col	1	0	4			1	59	199	110	1	0	0
Virginia	7	6	6	95	91	47	97	973	607	1	1	1
West Virginia	0	8	7	2	4	6	108	393	59	2	1	2
North Carolina	10	5	7			1	439	1 182	459	1	0	0
South Carolina	3	3	2	154	80	80	105	332	64	0	0	1
Georgia	0	4	3	12	20	8	103	440	153	1	0	0
Florida	0	6	6	- -	14	3	73	198	62	0	0	0
E SO CEN												
Kentucky	3	6	6		2	3	50	593	154	1	0	0
Tennessee	0	1	2	7	29	20	151	365	116	1	0	1
Alabama	1	3	6	18	14	14	77	179	148	1	2	3
Mississippi [2]	3	3	3	--		-	-	- -		2	0	0
W SO CEN												
Arkansas	7	4	3	7	5	12	77	181	45	1	0	0
Louisiana	2	1	4	-	1	4	62	18	18	0	3	0
Oklahoma	2	1	4	30	3	10	57	117	117	0	0	0
Texas	17	4	20	239	245	156	423	516	420	1	0	1
MOUNTAIN												
Montana	0	1	0	4	1	-----	88	40	86	0	0	0
Idaho	0	0	1	----	-----	------	57	31	25	0	0	0
Wyoming	1	0	1	-	-	----	32	14	14	0	0	0
Colorado	4	8	6	31	18	2	336	282	151	0	0	0
New Mexico	1	0	1	-	1	1	45	212	38	0	0	0
Arizona	1	10	2	36	60	27	62	104	33	0	0	0
Utah [2]	0	0	0	1	5	-----	811	30	86	0	0	0
Nevada	0	0	------	----	----	-----	13	13	------	0	0	----
PACIFIC												
Washington	1	1	1	3	15	----	425	30	40	0	1	0
Oregon	0	1	1	3	7	8	102	72	72	0	3	0
California	13	16	20	33	495	50	4 202	600	600	3	2	2
Total	153	192	236	754	1 161	731	16 646	28 409	14 169	68	32	49
22 weeks	5 743	5,715	9,267	76,059	481 659	155,775	408,494	743,842	301,185	1 716	1,063	1,063

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended June 6, 1942, and comparison with corresponding week of 1941 and 5-year median—Continued.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41
	June 6, 1942	June 7, 1941		June 6, 1942	June 7, 1941		June 6, 1942	June 7, 1941		June 6, 1942	June 7, 1941	
NEW ENG.												
Maine	1	0	0	4	3	4	0	0	0	0	0	1
New Hampshire	0	1	0	28	0	5	0	0	0	1	0	0
Vermont	0	0	0	19	5	6	0	0	0	0	0	0
Massachusetts	0	1	1	244	166	166	0	0	0	2	5	1
Rhode Island	0	0	0	9	9	9	0	0	0	0	0	0
Connecticut	0	1	0	10	35	39	0	0	0	0	1	1
MID. ATL.												
New York	0	3	3	267	411	519	0	0	0	5	7	7
New Jersey	0	0	0	107	173	131	0	0	0	0	2	2
Pennsylvania	0	1	0	234	297	292	0	0	0	11	6	7
E. NO. CEN.												
Ohio	0	0	0	211	229	235	1	1	2	1	6	6
Indiana	0	0	0	44	42	75	1	1	22	3	0	1
Illinois	1	3	2	142	180	320	8	12	12	3	5	5
Michigan [2]	0	0	0	38	125	262	0	5	2	0	1	3
Wisconsin	1	2	1	111	79	103	5	1	2	0	1	1
W. NO. CEN.												
Minnesota	3	0	0	35	40	70	0	0	16	1	3	1
Iowa	0	0	0	26	7	45	0	0	21	1	0	0
Missouri	0	0	0	43	55	55	1	0	28	6	2	2
North Dakota	0	0	0	16	0	4	0	0	0	2	1	1
South Dakota	0	1	0	15	1	15	0	2	5	0	0	0
Nebraska	0	0	0	13	6	13	0	1	1	0	0	0
Kansas	0	0	0	42	27	38	0	0	6	0	1	1
SO. ATL.												
Delaware	0	0	0	14	17	3	0	0	0	0	1	0
Maryland [2]	1	1	0	67	36	30	0	0	0	4	1	2
Dist. of Col.	0	0	0	4	8	8	0	0	0	1	0	1
Virginia	0	0	0	15	19	19	0	0	0	1	7	6
West Virginia	0	0	0	17	18	21	1	0	0	3	2	3
North Carolina	0	0	1	16	24	14	0	0	0	2	3	3
South Carolina	0	1	1	1	3	5	1	1	0	4	4	8
Georgia	0	1	1	12	9	6	0	0	0	15	9	9
Florida	0	3	1	2	1	1	0	0	0	3	12	2
E. SO. CEN.												
Kentucky	1	1	1	25	41	35	0	3	1	2	4	5
Tennessee	0	0	0	27	40	32	3	2	2	4	4	4
Alabama	3	1	1	16	12	8	1	1	0	2	2	3
Mississippi [2]	0	0	0	5	3	2	0	2	0	6	2	3
W. SO. CEN.												
Arkansas	0	0	0	4	1	2	7	1	2	5	5	10
Louisiana	0	0	1	5	4	4	4	1	0	15	3	10
Oklahoma	0	2	0	11	7	10	0	5	8	1	3	7
Texas	3	0	0	35	21	30	0	0	5	11	11	13
MOUNTAIN												
Montana	0	0	0	11	11	12	0	0	2	0	0	0
Idaho	0	0	0	2	7	6	0	1	1	0	1	1
Wyoming	0	0	0	11	2	4	0	0	0	1	0	0
Colorado	0	1	0	29	21	30	3	0	4	2	0	1
New Mexico	0	0	0	2	0	9	0	0	0	0	2	2
Arizona	0	0	0	4	6	5	0	0	0	0	1	1
Utah [2]	0	0	0	9	6	8	0	0	0	0	1	0
Nevada	0	0	-----	0	0	-----	0	0	-----	0	0	-----
PACIFIC												
Washington	1	0	0	22	19	23	0	2	2	1	0	1
Oregon	1	0	0	8	9	11	0	0	7	1	2	2
California	1	5	6	105	103	187	0	0	2	3	8	7
Total	17	29	36	2,137	2,338	3,099	36	42	242	123	124	192
22 weeks	453	495	495	78,950	78,846	103,808	507	1,000	6,750	1,823	1,871	2,606

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended June 6 1942—Continued

Division and State	Whooping cough, Week ended— June 6, 1942	Whooping cough, Week ended— June 7, 1941	Week ended June 6, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	31	14	0	0	0	0	0	0	0	0	0
New Hampshire	3	6	0	0	0	0	0	0	0	0	0
Vermont	63	7	0	0	0	0	0	0	0	0	0
Massachusetts	240	286	0	0	1	0	0	0	0	0	0
Rhode Island	19	27	0	0	0	0	0	0	0	0	0
Connecticut	91	58	0	0	0	0	1	0	0	0	0
MID. ATL.											
New York	381	359	0	2	3	0	0	0	0	0	2
New Jersey	420	122	0	0	0	0	1	0	0	0	0
Pennsylvania	233	330	0	0	0	0	1	0	1	0	0
E. NO. CEN.											
Ohio	131	325	0	0	0	0	0	0	0	0	0
Indiana	54	35	0	0	0	0	0	0	0	0	0
Illinois	268	102	0	1	0	0	0	0	3	0	0
Michigan [2]	130	318	0	0	0	0	0	0	0	0	0
Wisconsin	211	125	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	31	87	0	1	0	0	1	0	0	1	0
Iowa	16	33	0	1	0	0	0	0	0	0	0
Missouri	18	53	0	0	0	1	0	0	0	1	0
North Dakota	6	28	0	0	0	0	2	0	0	0	0
South Dakota	2	5	0	0	0	0	1	0	0	0	0
Nebraska	13	11	0	0	0	0	0	0	0	0	0
Kansas	63	157	0	0	0	0	1	0	0	0	0
SO. ATL.											
Delaware	1	0	0	0	0	0	0	0	0	0	0
Maryland [2]	50	108	0	0	0	1	0	0	2	0	0
Dist. of Col.	21	11	0	0	0	0	0	0	0	0	0
Virginia	64	65	0	0	0	53	0	0	3	0	0
West Virginia	57	58	0	0	0	0	0	0	0	0	0
North Carolina	112	347	0	0	0	0	0	0	1	0	0
South Carolina	126	92	0	0	0	0	0	0	0	0	4
Georgia	62	27	0	1	20	0	0	0	1	3	7
Florida	9	7	0	0	0	0	0	0	0	0	3
E. SO. CEN.											
Kentucky	70	52	0	0	2	0	0	0	0	1	0
Tennessee	48	51	0	0	0	6	1	0	0	1	1
Alabama	53	55	0	0	0	0	1	0	0	0	6
Mississippi [2]	------	------	0	0	0	0	0	0	0	0	0
W. SO. CEN.											
Arkansas	17	60	0	0	2	0	0	0	0	0	0
Louisiana	4	4	0	0	1	0	0	0	0	2	2
Oklahoma	4	24	0	0	0	0	0	0	1	0	0
Texas	147	294	0	1	166	0	0	1	0	1	10
MOUNTAIN											
Montana	14	6	0	0	0	0	0	0	0	0	0
Idaho	3	17	0	0	0	0	0	0	0	0	0
Wyoming	3	12	0	0	0	0	0	0	4	3	0
Colorado	43	185	0	0	0	0	1	0	3	0	0
New Mexico	4	55	0	0	1	0	0	0	0	0	0
Arizona	14	40	0	0	0	28	0	0	0	0	0
Utah [2]	33	62	0	0	0	0	0	0	0	0	0
Nevada	6	15	0	0	0	0	0	0	2	0	0
PACIFIC											
Washington	41	123	0	0	0	0	0	0	0	0	0
Oregon	22	24	0	0	0	0	0	0	0	0	0
California	313	894	0	2	4	0	2	1	0	0	0
Total	3,765	5,176	0	9	200	89	13	2	21	13	35
22 weeks	84,303	103,062	------	------	------	------	------	------	------	------	------

[1] New York City only.

[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended May 23, 1942

This table lists the reports from 90 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles, cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping-cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	4	1	2	0	3	0	0	0	1	5
Baltimore, Md	1	0	1	1	212	4	6	0	40	0	0	51
Barre, Vt	0	0		0	0	0	0	0	0	0	0	10
Billings Mont	0	0		0	5	0	0	0	0	0	0	0
Birmingham, Ala	0	0	7	0	2	0	1	0	3	0	0	3
Boise, Idaho	0	0		0	18	0	0	0	0	0	0	0
Boston, Mass	0	0		0	399	2	6	0	85	0	0	53
Bridgeport Conn	0	0		0	31	0	1	0	9	0	0	1
Brunswick, Ga	0	0		0	4	0	2	0	0	0	0	0
Buffalo, N Y	0	0		0	21	0	9	0	6	0	0	7
Camden, N J	0	0		0	0	0	2	0	2	0	0	5
Charleston, S C	1	0	1	0	4	0	2	0	0	0	0	0
Charleston W Va	0	0		0	0	0	0	0	0	0	0	0
Chicago Ill	13	0	1	0	48	0	26	0	74	0	0	113
Cincinnati, Ohio	0	0	2	1	3	0	0	1	18	0	0	8
Cleveland, Ohio	0	0	3	0	13	3	5	0	45	0	0	32
Columbus Ohio	0	0		0	34	0	1	0	6	0	0	8
Concord, N H	0	0		0	0	0	2	0	0	0	0	0
Cumberland, Md	0	0		0	0	0	0	0	0	0	0	0
Dallas Tex	0	0	1	1	15	0	4	0	3	0	0	1
Denver, Colo	3	0	13	0	151	0	5	0	4	0	0	8
Detroit, Mich	3	0		0	20	0	8	0	147	0	0	110
Duluth, Minn	0	0		0	2	0	0	0	7	0	0	3
Fall River, Mass	0	0		0	38	0	1	0	17	0	0	0
Fargo, N Dak	0	0		0	16	0	1	0	0	0	0	2
Flint Mich	0	0		0	0	0	2	0	1	0	0	3
Fort Wayne, Ind	0	0		0	0	0	2	0	1	0	0	2
Frederick Md	0	0		0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0		0	5	0	3	0	0	0	0	6
Grand Rapids, Mich	0	0		0	4	0	1	0	1	0	0	11
Great Falls, Mont	0	0		0	31	0	2	0	0	0	0	1
Hartford, Conn	1	0	1	0	148	0	2	0	4	0	0	16
Helena, Mont	0	0		0	18	0	0	0	0	0	0	0
Houston, Tex	1	0		0	13	0	2	0	0	0	1	2
Indianapolis, Ind	0	0		0	131	0	6	0	6	0	0	22
Kansas City, Mo	5	0		0	75	0	1	0	26	0	0	1
Kenosha, Wis	0	0		0	13	0	1	0	1	0	0	15
Little Rock, Ark	0	0	4	0	2	0	0	0	0	0	0	1
Los Angeles, Calif	2	0	11	2	481	2	12	0	14	0	0	9
Lynchburg Va	0	0		0	0	0	2	0	0	0	0	41
Memphis, Tenn	0	0		0	38	0	2	0	1	0	0	9
Milwaukee Wis	0	0		0	272	0	2	0	24	0	0	44
Minneapolis, Minn	1	0		0	372	0	0	0	17	0	0	9
Missoula, Mont	0	0		0	17	0	0	0	0	0	0	0
Mobile, Ala	1	0	1	1	1	0	2	0	1	0	2	0
Nashville, Tenn	0	0		1	3	0	2	0	0	0	0	0
Newark, N J	0	0	1	0	345	1	4	0	24	0	0	47
New Haven, Conn	0	0		0	76	0	0	0	0	0	0	4
New Orleans, La	1	0	2	2	23	1	3	0	4	0	3	2
New York, N Y	14	1	5	1	127	17	44	0	191	0	2	224
Omaha Neb	0	0		0	103	0	1	0	4	0	0	0
Philadelphia, Pa	1	1		1	54	0	7	0	121	0	1	97
Pittsburgh, Pa	0	0		0	10	1	9	0	19	0	0	19
Portland, Me	0	0		0	14	0	0	0	0	0	0	5
Providence, R I	0	0		0	178	0	4	0	9	0	0	45
Pueblo, Colo	1	0		0	1	0	0	0	3	0	0	9
Racine, Wis	0	0		0	275	0	0	0	8	0	0	22
Raleigh, N C	1	0		0	9	0	0	0	0	0	0	2
Reading, Pa	0	0		0	8	0	1	0	1	0	0	8
Richmond, Va	1	0		0	3	0	2	0	0	0	0	4

City reports for week ended May 23, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles, cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping-cough cases
Roanoke, Va	0	0	------	0	0	0	0	0	0	0	0	0
Rochester, N. Y	0	0	------	0	7	0	1	0	7	0	0	5
Sacramento, Calif	2	0	------	0	70	0	3	0	1	0	0	38
Saint Joseph, Mo	1	0	------	0	3	0	2	0	0	0	0	0
Saint Louis, Mo	0	1	------	0	68	0	7	1	10	0	0	3
Saint Paul, Minn	0	0	------	0	120	0	6	0	2	0	0	18
Salt Lake City, Utah	0	0	------	1	368	0	0	0	1	0	0	3
San Antonio, Tex	0	0	------	0	19	0	6	0	0	0	0	1
San Francisco, Calif	1	0	------	0	291	0	7	0	5	0	0	0
Savannah, Ga	0	0	2	1	0	0	0	0	0	0	0	2
Seattle, Wash	0	0	------	0	202	3	3	0	0	0	1	22
Shreveport, La	0	0	------	0	3	0	1	0	0	0	0	0
South Bend, Ind	0	0	------	0	5	0	0	0	4	0	0	1
Spokane, Wash	0	0	------	0	59	0	1	0	0	0	0	1
Springfield, Ill	0	0	------	0	7	0	0	0	5	0	0	0
Springfield, Mass	1	0	------	0	79	0	5	0	10	0	0	7
Superior, Wis	0	0	------	0	1	0	0	0	5	0	0	0
Syracuse, N. Y	0	0	------	0	447	1	2	0	1	0	2	23
Tacoma, Wash	0	0	------	0	16	0	3	0	2	0	0	3
Tampa, Fla	0	0	------	0	50	0	0	0	0	0	0	2
Terre Haute, Ind	0	0	------	0	0	0	0	0	0	0	0	0
Topeka, Kans	0	0	------	0	15	0	1	0	0	0	0	4
Trenton, N. J	0	0	------	0	0	0	3	0	5	0	0	2
Washington, D. C	2	0	1	0	97	2	7	0	12	0	0	9
Wheeling, W. Va	0	0	------	0	3	0	2	0	2	0	0	0
Wichita, Kans	0	0	1	0	87	0	6	0	1	0	0	6
Wilmington, Del	0	0	-----	0	5	0	2	0	1	0	0	0
Wilmington, N. C	0	0	------	0	5	0	2	0	0	0	0	13
Winston-Salem, N. C	0	0	------	0	9	0	0	0	3	0	0	0
Worcester, Mass	0	0	------	0	6	0	9	0	11	0	0	70

Anthrax—Cases. Philadelphia, 1.
Dysentery, amebic.—Cases. Baltimore, 1; New York, 3; Philadelphia, 1.
Dysentery, bacillary.—Cases Baltimore, 2; Hartford, 2; New York, 3.
Leprosy.—Cases. New Orleans, 1.
Tularemia.—Cases: Boise, 1; Philadelphia, 1.
Typhus fever.—Cases: New Orleans, 1; Philadelphia. 1.

Rates (annual basis) per 100,000 population, for the group of 90 cities in the preceding table (estimated population, 1942, 34,134,198)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
Week ended May 23, 1942	8.86	9.47	2.14	905.09	43.23	158.10	0.00	1.99	203.63
Average for week, 1937–41	14.20	10.50	4.01	[1] 683.93	64.07	256.74	2.16	3.55	192.21

[1] Median.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended May 9, 1942.—During the week ended May 9, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		3	3	5	7	1		1	3	23
Chickenpox		22		134	286	22	21	49	116	650
Diphtheria		17		17	2	2	1	3		42
Dysentery	5			2		1				8
German measles		1		20	63	4	9	13	25	135
Influenza		9				2			36	47
Lethargic encephalitis						1				1
Measles		2		476	160	142	14	16	25	835
Mumps	2	6		155	459	113	220	45	421	1,421
Pneumonia	8	12			19	3	1		13	56
Poliomyelitis			4							4
Scarlet fever	7	12	14	181	224	23	34	86	45	626
Trachoma							2			2
Tuberculosis	2	9	8	63	50		1	7	22	162
Typhoid and paratyphoid fever				13	1		3			17
Undulant fever				1	3	1	1		1	7
Whooping cough		20	2	147	111	8		19	75	382
Other communicable diseases	5	14		3	220	39	2	3	6	292

CUBA

Habana—Communicable diseases—4 weeks ended May 2, 1942.—During the 4 weeks ended May 2, 1942, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	24		Rabies	1	
Leprosy	1		Scarlet fever	1	
Malaria	16	2	Tuberculosis	5	2
Measles	26	1	Typhoid fever	81	8
Poliomyelitis	1				

Provinces—Notifiable diseases—4 weeks ended April 25, 1942.—During the 4 weeks ended April 25, 1942, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	2	3	2	8		18	33
Chickenpox				3	3	12	18
Diphtheria		16		2	9	1	28
Hookworm disease		30					30
Leprosy		1		1	1	4	7
Malaria	36	17	1	1	4	439	498
Measles		24		2	1	1	28
Poliomyelitis		1				1	2
Rabies		1					1
Scarlet fever		1					1
Tuberculosis	12	164	12	51	23	33	295
Typhoid fever	8	89	9	42	7	20	175
Whooping cough			2				2
Yaws						1	1

[1] The city of Habana is also included.

PANAMA CANAL ZONE

Notifiable diseases—January–March 1942.—During the months of January, February, and March, 1942, certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:

Disease	January		February		March	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	8		14		10	
Diphtheria	16		7		11	
Dysentery (amebic)	12	1	9	2	6	3
Dysentery (bacillary)	10	10	6	3	6	5
Leprosy				1		
Malaria	460	10	386	6	366	4
Measles	302	6	90	1	82	
Meningococcus meningitis	3	1	2		1	
Mumps	3		4		2	
Paratyphoid fever			1		1	
Pneumonia	[1] 65	35	[1] 36	24	[1] 38	19
Relapsing fever					2	
Tuberculosis	[1] 10	47	[1] 6	37	[1] 7	30
Typhoid fever	4		3		1	
Typhus fever	1				1	
Whooping cough	[1] 10	3			[1] 2	

[1] In the Canal Zone only.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

Plague

China.—Plague has been reported in China as follows: Chekiang Province, April 1–10, 1942, 4 cases; Fukien Province, Jan. 1–Apr. 5, 1942, plague appeared in 11 localities; Hunan Province, week ended April 18, 1942, 2 cases; Suiyan Province, pneumonic plague appeared in epidemic form during the period Jan. 1–Apr. 4, in the northwestern area.

Peru.—During the period April 1–30, 1942, plague was reported in Peru as follows: Lima Department, 8 cases, 6 deaths; Piura Department, 6 cases.

Yellow Fever

Brazil.—Acre Territory.—During the period January 26–28, 1942, 2 deaths from yellow fever were reported in Acre Territory, Brazil.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E R COFFEY, *Assistant Surgeon General, Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world, (2) articles relating to the cause, prevention, and control of disease, (3) other pertinent information regarding sanitation and the conservation of the public health

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DISTRIBUTION OF HEALTH SERVICES IN THE STRUCTURE OF STATE GOVERNMENT

CHAPTER V—SANITATION BY STATE AGENCIES—Continued*

By JOSEPH W. MOUNTIN, *Assistant Surgeon General*, and EVELYN FLOOK, *United States Public Health Service*

SANITATION OF FOODS AND DRUGS AND OF FOOD-HANDLING ESTABLISHMENTS

In contradistinction to the relatively well-defined programs for sanitation of water and sewerage, those which operate for control of foods and drugs are characterized by extreme diversity. Unlikeness obtains both in organization and in program content. Most striking, perhaps, is the lack of agreement as to what food and drug control should actually consist of. Administrative confusion is the natural result of this disagreement.

The over-all pattern for the several States bespeaks multiformity along three fronts: First, in the particular types of services encompassed by food and drug control; second, in the official agency or agencies charged with responsibility for carrying out the program; and third, in the control methods that are employed. The list of activities which appear under the designation "Food and Drug Control" or which, even if not so designated, are engaged in—either coordinately with, or subordinately to, the main program—can be described only as miscellaneous as one follows the range from State to State.

Food control may be limited to sanitation of food-manufacturing establishments or, as is more usual, it may extend to laboratory analysis of the finished product to determine the accuracy of branding and the sanitary quality. The types of food upon which attention is most sharply focused also vary from State to State. Whereas manu-

*The first section of this chapter, Sanitation of Water Supplies and Sewerage Systems, was published in the PUBLIC HEALTH REPORTS, 57: 885-902 (June 12, 1942).

factured dairy products—ice cream, cheeses, butter, etc.—receive particular emphasis in some places, bakery and confectionery products are more closely observed in others; in a third group special effort may be directed toward canned food or bottled beverages.

Inspection of markets, stores, and other sales places either for cleanliness of the premises or for quality and purity of the food stock, or both, may or may not be included in the State program. Sanitary control of slaughterhouses is covered in over two-thirds of the States, and in about half of them provision is made for State supervision of cold storage warehouses. An additional step in the food work of some States pertains to supervision of hotels, restaurants, lunch counters, and any similar place preparing or serving food for immediate consumption. In nearly two-thirds of the States, hotel and restaurant inspection is an integral part of the State service for general food control. In about one-fifth of them it is set up as a separate entity, and in the remainder hotel and restaurant inspection is not a function of any State agency. Finally, prevention of mislabeling, adulteration, and false advertising of food is another control feature emphasized by some States and ignored by others. Such regulations are limited to package and label claims in some instances and, under other circumstances, are extended to newspaper, magazine, and handbill advertising.

Sanitation of shellfish producing areas is a problem which, because of geographic characteristics of the States, is confined to less than half of them. This work represents a portion of the general service of the food and drug division in 40 percent of the twenty-odd States which carry on shellfish sanitation activities; in the remainder, it is performed under other auspices.

Some aspect of milk sanitation is carried on at the State level in each of the jurisdictions surveyed. The States are almost evenly divided, however, in their practice of including milk sanitation as a part of the State food and drug set-up or of combining it with some other State service, such as general sanitary engineering.

The activity range for drug control usually pertains to their purity and potency, to the labeling thereof, and to the claims made therefor. Probably the major point of difference among the various States lies in the inclusion or exclusion of provisions governing the sale and dispensing of narcotic drugs. About one-third of the States include this item. Disagreement also exists as to the extension of drug control services to cover regulation of cosmetics and requirements for cosmeticians. Another point of variance is whether the States are responsible for any drug work or whether service within the State is left entirely to the resourcefulness of the Federal agency, as is done in nearly one-fourth of the jurisdictions contacted. Still a third

important difference is noted in the coordination of drug with food work in approximately 75 percent of the States providing both services, as opposed to the independent operation of the two programs in the other 25 percent.

If the State programs for food and drug control are characterized by disagreement or lack of accord as to content, the alliance of the State agencies for carrying out these programs is equally as haphazard. For the country as a whole, approximately a dozen separate types of State agencies either singly or jointly participate in some phase of the State's food and drug activities. An enumeration of these State agencies follows: Health department, department of agriculture, special food and dairy commission or hotel and restaurant commission, commission of domestic animals or livestock sanitary board, department of labor, department of conservation, board of pharmacy, State laboratory department or independent State laboratory, State university or college, and those termed "other," which cover the State fire marshal, department of registration and education, department of penology, agricultural experiment station, and board of district commissioners. It may be argued that the principal distinction between several of these agencies lies in terminology. Study of their organization and actual functioning, however, reveals more far-reaching differences in most instances. Naturally, the primary interest of these various agencies is not the same. As a result, their respective programs emphasize entirely different branches of the total problem. Whereas health significance of the work will be stressed in one State, in another the primary concern will be prevention of fraud or commercial control.

Wide dispersion of service among numerous agencies applies not only to the country as a whole, but also to service within separate States. The maximum number of agencies identified with food and drug work [4] in an individual State is five, a situation which exists four times. The most usual arrangement is a three-agency program. Such division of effort occurs in 20 States, while two agencies are involved in 15 States, and four agencies in 12. Only two jurisdictions report concentration of all food and drug activities under single administrative department. The health department and the department of agriculture are the agencies which most commonly participate in measures for food and drug control. Even when a special food and drug division is set up within the department of agriculture for administration of the main program, the health department generally plays some small part—restricted though that part might be to service which is advisory or educational in nature. Table 3 denotes the

[4] Activities covered under "food and drug work" pertain to general food and drug control, to supervision of hotels and restaurants, to shellfish sanitation, and to milk control—including sanitation and eradication of bovine tuberculosis and Bang's disease.

agencies which participate in the food and drug activities of each separate State.

TABLE 3.—*Official State agencies participating in the control of foods and drugs* in each State and Territory, the District of Columbia, and the Virgin Islands ***

State or Territory	Department of State government									
	Health	Agriculture	Dairy and food commission, State dairy department, hotel and restaurant board, etc	Commission on domestic animals, livestock sanitary board, etc	Labor	Conservation	Board of pharmacy	Independent State laboratory, State chemist, etc.	State university or college	Other
Alabama	X	X		X						
Arizona	X		X	X			X	X		
Arkansas	X			X						
California	X	X			X					X
Colorado	X	X		X				X		
Connecticut	X		X	X						X
Delaware	X	X								
District of Columbia	X									X
Florida	X	X	X	X		X				
Georgia	X	X								
Idaho [a]	X	X						X		
Illinois	X	X								X
Indiana	X			X			X			
Iowa	X	X					X			
Kansas	X	X	X	X					X	
Kentucky	X			X						
Louisiana	X			X						
Maine [a]	X	X								X
Maryland	X	X				X				
Massachusetts	X	X				X				
Michigan	X	X			X		X			
Minnesota	X	X		X			X			
Mississippi	X			X				X		
Missouri	X	X					X			
Montana	X			X						
Nebraska		X								
Nevada	X	X							X	
New Hampshire	X	X					X			
New Jersey	X	X			X					
New Mexico	X			X						
New York	X	X				X	X			
North Carolina	X	X				X	X			
North Dakota	X	X		X				X		
Ohio	X	X					X			X
Oklahoma	X	X								
Oregon	X	X			X					
Pennsylvania	X	X					X			
Rhode Island	X	X								
South Carolina	X								X	
South Dakota	X	X		X			X		X	
Tennessee	X	X			X	X				
Texas	X	X		X						
Utah		X						X		X
Vermont	X	X								
Virginia	X	X					X			
Washington	X	X			X			X		
West Virginia	X	X					X			
Wisconsin	X	X								
Wyoming	X	X		X				X		
Alaska	X									
Hawaii	X	X								
Puerto Rico	X	X								X
Virgin Islands	X	X								

* Activities herein summarized pertain to general food and drug control, to supervision of hotels, and restaurants, to shellfish sanitation, and to milk control—including sanitation and eradication of bovine tuberculosis and Bang's disease

** Any differences between information presented in this table and corresponding entries in table 1, ch. I, of this series are the result of combining several activities originally shown separately, or of further refinement of the data since publication of the initial article

[a] The department of health is really a division (Idaho) and bureau (Maine) of public health, subordinate to the department of welfare (Idaho) and the department of health and welfare (Maine)

Absolutely no uniformity exists in the division of labor when several departments, boards, or commissions contribute to the total food and drug service. In some States, matters of sanitation of food manufacturing, sales, and service establishments are assigned to the health department, while collection and laboratory analysis of food and drug samples for purity, quality, and accuracy of labeling represent the duties of the department of agriculture. In other States, as previously indicated, the division occurs between food and drugs. In still others, certain items of the food program—such as inspection of slaughter houses, of dairy farms and plants, or of hotels and restaurants, or the complete control of manufactured dairy products may be segregated from the general program and charged to one or more separate agencies. Occasionally, only the narcotic drug supervision is separated from all other food and drug activities. Again, the laboratory work will represent the sole contribution of an agency other than the one having major responsibility. (See table 4.) Still another method of assigning control is found in the arrangement which makes the health department responsible for regulation and administration of service and supervision of local work in all areas having organized health units, while some other State agency functions in the remainder of the State.

In general, however, supervision of food and drug work carried on by local inspectors is split on a basis of particular activity, with the responsible State agency extending its direct service functions to include supervision of local work of the same category. Financial grants-in-aid are not made by the State to local units for food and drug work as such, but usually some portion of the grants made by State health departments to local health units for generalized health work is spent for this purpose. When included, promotional and educational programs, varying in extent, are usually health department activities. Efforts of milk sanitarians attached to the several health departments to secure adoption of the United States Public Health Service standard milk ordinance by political subdivisions of the State (towns, cities, counties, etc.) rank among the more outstanding promotional and educational projects.

Perhaps the most anomolous system of divided control is that wherein one agency is held responsible by law, but, because nothing was done, certain functions of that department have gradually been absorbed by another, on a voluntary basis. Lack of legal authority and failure to receive financial support for these unauthorized activities, necessary though they may have been, naturally places serious limitations upon the second agency, and its services are usually confined to promotional, educational, and advisory channels.

TABLE 4.—*Department of State government* responsible for specific activities for food and drug control** in each State and Territory, the District of Columbia, and the Virgin Islands*

Activity	State or Territory							
	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia
Promulgates and/or enforces State laws, rules, and regulations concerning one or more activities covered in this section	1, 2	1, 3, 7, 8	1	1, 2, 10	1, 2	1, 3, 4	1	11
Promotes local programs of control	1	1	1	1, 2	1	1		
Conducts educational programs	2			1	1			1
Supervises and/or provides consultation service to local organizations	1	1, 8	1	1, 2	1	1		
Distributes and/or administers financial grants-in-aid to local health units for food and drug control		1 [c]				1 [e]		
Operates a direct service program:								
Licenses and/or periodically inspects—								
Bakeries				1		3		
Confectioneries						3		
Ice cream, butter, and cheese factories		3		1		3	1	1
Bottling plants						3	1	
Cold storage warehouses				1				1
Slaughterhouses				2	1 [d]	4	1	1
Other and/or unspecified food manufacturing, packing, and sales establishments	1			1	1	3	1 [e]	1
Hotels	1	1 [d]	1					1
Food dispensing establishments		1 [d]	1	1	1		1	1
Dairy farms	1 [b], 4	3, 4	1, 4	2	2, 4	3, 4	1, 2	1
Pasteurization plants	1 [b]	3	1	2	2	3	1	1
Shellfish production facilities (growing areas, storage systems, shucking and packing plants)	1			1		1	1	
Drug manufacturing plants, stores, and/or distributors	2	7		1	1	1	1 [e]	1
Inspects for—								
General sanitation and cleanliness of premises and equipment	1	1, 8	1	1, 2	1, 2	1, 3	1	1
Health of employees	1	1			1	3		1
Purity, quality, and condition of food or drug product handled; misbranding, mislabeling	2	7, 8		1, 2	1	3	1 [e]	1
False advertising claims				1				1
Sale or distribution of narcotic drugs				10	1	1		
Water supply, plumbing, toilets, and/or sewage disposal facilities	1	1	1	1, 5	1	1	1	1
Health of dairy herds	4	4	4	2	4	4	2	
Construction and operation of pasteurization plants	1 [b]	3	1	2	2	3	1	1
Other purposes not covered in this classification	1	1		1, 5	1			
Collects samples of suspicious products	2	8		1	1	3		1
Provides facilities for laboratory analysis—								
Bacteriological—water (drinking, dish-washing solutions, shellfish areas)	1	8		1	1	1	1	1
Bacteriological—food		8		1	8	1	1 [e]	1
Chemical—food	2	8		1	8	10	1 [e]	1
Chemical—drugs	2			1	8	10	1 [e]	1
Physiological—drugs						10	1 [e]	
Bacteriological—milk	1	8				1	1	1
Chemical—milk	1	8		1		1	1	1
Participates in indemnities for condemned dairy animals	4	4	4	2	4	4		
Renders additional service not covered in this classification			1		1		1	1

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities for food and drug control in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Florida	Georgia	Idaho [a]	Illinois	Indiana	Iowa	Kansas	Kentucky
Promulgates and/or enforces State laws, rules, and regulations concerning one or more activities covered in this section	1, 2, 3, 6	2	1	1, 2, 10	1	2, 7	1, 2, 3	1
Promotes local programs of control	1, 3	1	-	-	-	1	-	1
Conducts educational programs	-	1	-	-	-	1	-	-
Supervises and/or provides consultation service to local organizations	1, 3	2 [b]	-	2	1	-	1	1
Distributes and/or administers financial grants-in-aid to local health units for food and drug control	1[c]	-	-	-	-	-	-	1[e]
Operates a direct service program:								
Licenses and/or periodically inspects—								
Bakeries	-	2	1	-	-	2	-	1
Confectioneries	-	2	1	-	-	2	-	1
Ice cream, butter, and cheese factories	-	2	-	2	1	2	2	1
Bottling plants	1	2	-	-	-	2	1	-
Cold storage warehouses	-	2	1	2	1	2	1	-
Slaughterhouses	1[e]	2	-	2	1	2	-	1
Other and/or unspecified food manufacturing, packing, and sales establishments	-	2	1	2	1	2	1	1
Hotels	3	2	1	1	-	2	3	1
Food dispensing establishments	3	2	1	2	1	2	3	1
Dairy farms	1, 2, 4	2	1, 2	1, 2	1, 4	2	1, 2, 4	1, 4
Pasteurization plants	1, 2	1 [b], 2	1	1	1	1 [b], 2	1, 2	1
Shellfish production facilities (growing areas, storage systems, shucking and packing plants)	1, 6	([f])	-	-	-	-	-	-
Drug manufacturing plants, stores, and/or distributors	1	2	1	10	1, 7	7	1	1
Inspects for—								
General sanitation and cleanliness of premises and equipment	1, 2, 3	1, 2	1	1, 2	1	2, 7	1, 2, 3	1
Health of employees	1, 3	2 [g]	1	-	1	2 [g], 7 [g]	1, 3	-
Purity, quality, and condition of food or drug product handled; misbranding; mislabeling	1, 2, 3	2	1	2, 10	1	2, 7	1, 3	1
False advertising claims	2	2	-	-	1	-	1	-
Sale or distribution of narcotic drugs	1	-	-	10[e]	-	7	-	-
Water supply, plumbing, toilets, and/or sewage disposal facilities	3	-	-	1	-	2	3	1
Health of dairy herds	4	2	2	2	4	2	4	4
Construction and operation of pasteurization plants	1, 2	1 [b], 2	1	1	1	1 [b], 2	1, 2	1
Other purposes not covered in this classification	3	-	-	1	-	2	3	1
Collects samples of suspicious products	1, 3	2	1	2	1	2, 7	1	1
Provides facilities for laboratory analysis—								
Bacteriological—water (drinking, dishwashing solutions, shellfish areas)	1	1	-	1, 2	1	1	-	1
Bacteriological—food	-	2	1	2	1	2	1, 9	1
Chemical—food	2	2	1	2	1	2	1, 9	1
Chemical—drugs	2	2	1	-	1	2	1, 9	1
Physiological—drugs	-	-	-	-	1	-	-	1
Bacteriological—milk	1	2	1	-	1	1	1	1
Chemical—milk	1	-	8	2	1	2	1	1
Participates in indemnities for condemned dairy animals	4	2	2	2	4	2	-	4
Renders additional service not covered in this classification	1	-	-	1, 2	1	-	1	1

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities for food and drug control in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Louisiana	Maine [a]	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri
Promulgates and/or enforces State laws, rules, and regulations concerning one or more activities covered in this section	1	1, 2, 10	1	1	2, 5, 7	1, 2	1, 8	1, 2
Promotes local problems of control	1	1, 2	1	------	1, 2	1	1	------
Conducts educational programs	------	------	------	------	1	2	------	1
Supervises and/or provides consultation service to local organizations	1	1, 2	1	1	2, 7	1	1	1
Distributes and/or administers financial grants-in-aid to local health units for food and drug control	1[c]	------	1[c]	------	------	------	1[c]	------
Operates a direct service program:								
Licenses and/or periodically inspects—								
Bakeries	1[d]	------	------	1	------	2	------	------
Confectioneries	1[d]	------	------	1	------	2	------	------
Ice cream, butter, and cheese factories	1[d]	------	1	------	------	2	------	2
Bottling plants	1[d]	------	1	1	2	2	------	2
Cold storage warehouses	1[d]	------	1	1	2	2	------	------
Slaughterhouses	1[d]	2	1	1	2	------	------	------
Other and/or unspecified food manufacturing, packing, and sales establishments	1[d]	2	1	1	2	[illegible]	------	2
Hotels	1[d]	1	------	------	5	1	1[d]	1
Food dispensing establishments	1[d]	1, 2	------	1	2	1	1[d]	1
Dairy farms	1[d], 4	2	1, 2	1, 2	2[d]	1, 2, 4	1, 4	1[b]
Pasteurization plants	1[d]	2	1, 2	1	1[b], 2[d]	1	1	1[b]
Shellfish production facilities (growing areas, storage systems, shucking and packing plants)	1	2, 10	1, 6	1, 6	------	------	1	------
Drug manufacturing plants, stores, and/or distributors	1	2	1	1	7	1, 7	------	7
Inspects for—								
General sanitation and cleanliness of premises and equipment	1	1, 2	1	1	2, 7	1, 2	1	1, 2
Health of employees	1	1[g]	1	------	------	------	------	1
Purity, quality, and condition of food or drug product handled; misbranding; mislabeling	1	1, 2	1	1	2, 7	1, 2, 7	1[e]	1, 2
False advertising claims	1	------	------	1	2	2	------	------
Sale or distribution of narcotic drugs	1	------	1	------	7	1	------	------
Water supply, plumbing, toilets, and/or sewage disposal facilities	1	1	1	------	------	1	------	1
Health of dairy herds	4	2	2	2	2	4	4	2
Construction and operation of pasteurization plants	1[d]	2	1	1	1[b], 2[d]	1	1	1[b]
Other purposes not covered in this classification	------	------	------	------	5	1	------	1
Collects samples of suspicious products	1	2	1	1	2, 7	2	------	1
Provides facilities for laboratory analysis—								
Bacteriological—water (drinking, dishwashing solutions, shellfish areas)	1	1	1	1	------	1	1	------
Bacteriological—food	1	1, 10	1	1	------	2	8	1
Chemical—food	1	1, 10	1	1	2	2	8	1
Chemical—drugs	1	1, 10	1	1	------	------	8	1
Physiological—drugs	------	------	------	------	1	------	8	------
Bacteriological—milk	1	1, 10	1	1	1	1	1	1
Chemical—milk	1	10	1	1	1	2	1	1
Participates in indemnities for condemned dairy animals	4	2	2	2	2	4	4	2
Renders additional service not covered in this classification	1	1	------	------	1	------	------	------

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities for food and drug control in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina
Promulgates and/or enforces State laws, rules, and regulations concerning one or more activities covered in this section	1, 4	2	1, 9	1, 2, 7	1, 5	1	1, 2, 6, 7	1, 2, 6, 7
Promotes local programs of control	1	------	1, 9	------	1	1	1, 2	1, 2
Conducts educational programs	1	------	1, 9	------	------	------	1	------
Supervises and/or provides consultation service to local organizations	1	2	1, 9	1	1	1	1, 2	1, 2
Distributes and/or administers financial grants-in-aid to local health units for food and drug control	------	------	------	------	------	1[e]	1[e]	------
Operates a direct service program:								
Licenses and/or periodically inspects—								
Bakeries	1	------	------	------	5	------	------	2
Confectioneries	1	------	------	------	1	------	------	------
Ice cream, butter, and cheese factories	4	2	------	------	1	------	------	2
Bottling plants	1	------	------	1	1	------	------	------
Cold storage warehouses	------	2	------	1	1	------	2	1
Slaughterhouses	4	------	9	1	1	------	2	1, 2
Other and/or unspecified food manufacturing, packing, and sales establishments	1	------	9	1	1	1[e]	2	2
Hotels	------	2	9	1	1	------	1	1
Food dispensing establishments	1	2	1	1	1	------	------	1
Dairy farms	4	2	1[b], 2	1[d], 2	1, 2	1[b], 4	1, 2	1
Pasteurization plants	4	2	1[b]	1[d], 2	1	1[b]	1	1
Shellfish production facilities (growing areas, storage systems, shucking and packing plants)	------	------	------	1	1	------	6	1, 6
Drug manufacturing plants, stores, and/or distributors	1	------	1	1, 7	1	1[e]	1, 7	2, 7
Inspects for—								
General sanitation and cleanliness of premises and equipment	1, 4	2	1, 9	1, 2	1	1	6	6
Health of employees	1	2	------	1[g]	------	------	------	1
Purity, quality, and condition of food or drug product handled; misbranding; mislabeling	1	2	1, 9	1	1	1[e]	2, 7	2
False advertising claims	------	------	------	1	------	------	2	2
Sale or distribution of narcotic drugs	------	------	1	------	1	------	1	7
Water supply, plumbing, toilets, and/or sewage disposal facilities	1	2	------	1	1	------	1	1
Health of dairy herds	4	2	2	2	2	4	2	2
Construction and operation of pasteurization plants	4	2	1[b]	1[d]	1	1[b]	1	1
Other purposes not covered in this classification	------	2	9	------	5	------	------	1
Collects samples of suspicious products	1	2	9	1	1	------	2	1, 2
Provides facilities for laboratory analysis—								
Bacteriological—water (drinking, dishwashing solutions, shellfish areas)	1	------	1, 9	1	1	1	1	1
Bacteriological—food	1	------	9	1	------	------	2	2
Chemical—food	1	2	9	1	1	1	2	2
Chemical—drugs	1	------	9	1	1	------	2	------
Physiological—drugs	------	------	------	------	------	------	2	------
Bacteriological—milk	4	2	1	1	1	1	------	------
Chemical—milk	4	2	9	1	1	------	------	------
Participates in indemnities for condemned dairy animals	4	2	2	2	2	4	2	2
Renders additional service not covered in in this classification	------	------	9	1	1	1	1	1

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities for food and drug control in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota
Promulgates and/or enforces State laws, rules, and regulations concerning one or more activities covered in this section	1, 2, 8	2, 7, 10	1, 2	1, 2	1, 2	1, 2	1	2, 7
Promotes local programs of control	8	-----	1	1, 2	-----	-----	1	-----
Conducts educational programs	-----	-----	-----	-----	-----	-----	-----	-----
Supervises and/or provides consultation service to local organizations	8	2	1	1, 2	1	1[b]	1	-----
Distributes and/or administers financial grants-in-aid to local health units for food and drug control	-----	-----	-----	-----	-----	-----	1[•]	-----
Operates a direct service program:								
Licenses and/or periodically inspects—								
Bakeries	8	2	-----	2	2	1	-----	2
Confectioneries	8	-----	-----	-----	-----	1	-----	2
Ice cream, butter, and cheese factories	2	2	-----	-----	2	1	-----	2
Bottling plants	8	2	-----	-----	2	-----	-----	2
Cold storage warehouses	8	2	-----	-----	2	-----	-----	-----
Slaughterhouses	8	2	1	2	2	1	-----	-----
Other and/or unspecified food manufacturing, packing, and sales establishments	8	2	1	2	2	1	1	-----
Hotels	8	10	1	5	1	-----	1	2
Food dispensing establishments	8	10	1	2	1	1	1	2
Dairy farms	1, 4, 8	1[b], 2[•]	1, 2	1, 2	1, 2	2	1, 9	4
Pasteurization plants	1	1[b], 2[•]	1	1, 2	1	1	1	1
Shellfish production facilities (growing areas, storage systems, shucking and packing plants)	-----	-----	-----	1	-----	1	1	-----
Drug manufacturing plants, stores and/or distributors	8	2[•], 7	1	-----	1, 7	1	1[h]	7
Inspects for—								
General sanitation and cleanliness of premises and equipment	1, 2, 8	2, 10	1, 2	1, 2	1, 2	1, 2	1	2
Health of employees	-----	10[g]	-----	2	1, 2	1	-----	-----
Purity, quality, and condition of food or drug product handled; misbranding; mislabeling	2, 8	2, 10	1	2	1, 2, 7	1	1[h]	2, 7
False advertising claims	8	-----	1	-----	7	1	-----	2, 7
Sale or distribution of narcotic drugs	-----	7	-----	-----	1	1	-----	-----
Water supply, plumbing, toilets, and/or sewage disposal facilities	8	10	1	2	1	1	1	2
Health of dairy herds	4	2	2	2	2	2	9	4
Construction and operation of pasteurization plants	1	1[b], 2[•]	1	1, 2	1	1	1	1
Other purposes not covered in this classification	8	-----	1	2	-----	1	1	2
Collects samples of suspicious products	8	2	1	2	2, 7	1	-----	2, 7
Provides facilities for laboratory analysis—								
Bacteriological—water (drinking, dishwashing solutions, shellfish areas)	1, 8	-----	1	-----	1	1	1	-----
Bacteriological—food	8	1	1	2	1	1	-----	9
Chemical—food	8	2	1	2	2	1	-----	9
Chemical—drugs	8	2	1	-----	7	1	-----	9
Physiological—drugs	8	-----	1	-----	-----	1	-----	-----
Bacteriological—milk	1, 8	1	1	1, 2	1	1, 2	1	1
Chemical—milk	1, 8	1	1	2	-----	1, 2	-----	2
Participates in indemnities for condemned dairy animals	4	2	2	2	2	2	9	4
Renders additional service not covered in this classification	-----	-----	1	-----	1	-----	-----	-----

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities for food and drug control in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin
Promulgates and/or enforces State laws, rules, and regulations concerning one or more activities covered in this section	2, 5, 6	1, 2	2	1, 2	1, 2, 7	1, 2, 5	1, 2, 7	1, 2
Promotes local programs of control	2	1	------	1	2	1, 2	1, 2	1
Conducts educational programs	------	1	------	------	------	------	1	2
Supervises and/or provides consultation service to local organizations	2, 6	1	------	1	------	1, 2	1	1
Distributes and/or administers financial grants-in-aid to local health units for food and drug control	------	1•	------	------	1•	------	------	------
Operates a direct service program:								
Licenses and/or periodically inspects:								
Bakeries	------	1	2	------	------	------	------	2
Confectioneries	------	1	------	------	------	------	------	2
Ice cream, butter, and cheese factories	2	1	------	------	2	2	2	2
Bottling plants	------	1	------	------	------	------	------	2
Cold storage warehouses	1	1, 2	2	------	2	------	------	2
Slaughterhouses	2	1	2	------	2	2	2•	2
Other and/or unspecified food manufacturing, packing, and sales establishments	2	1	------	1	2	------	------	2
Hotels	5, 6	------	------	1	1, 2	5	------	1
Food dispensing establishments	5, 6	1	------	1	1, 2	2	1	1
Dairy farms	1, 2	1, 4	2	2	1, 2	1, 2	1, 2	2
Pasteurization plants	1, 2	1	------	2	1, 2	1, 2	1	2
Shellfish production facilities (growing areas, storage systems, shucking and packing plants)	------	1	------	------	1	1	------	------
Drug manufacturing plants, stores, and/or distributors	2	1	2, 10	1	7	2	7•	2•
Inspects for—								
General sanitation and cleanliness of premises and equipment	2, 6	1, 2	2	1, 2	2	1, 2, 5	1	1, 2
Health of employees	5	------	------	1	2	1, 2	1	1
Purity, quality; and condition of food or drug product handled; misbranding; mislabeling	2, 6	1, 2	2	1	2, 7	2	2	2
False advertising claims	------	1	2	1	2, 7	2	------	2
Sale or distribution of narcotic drugs	2	------	------	------	7	------	7•	------
Water supply, plumbing, toilets, and/or sewage disposal facilities	6	1	------	1	------	2, 5	1	1
Health of dairy herds	2	4	2	2	2	2	2	2
Construction and operation of pasteurization plants	1, 2	1	------	2	1, 2	1, 2	1	2
Other purposes not covered in this classification	6	1	------	1	------	------	------	------
Collects samples of suspicious products	2	1	2	------	2, 7	1, 2	------	2
Provides facilities for laboratory analysis:								
Bacteriological—water (drinking, dishwashing solutions, shellfish areas)	1	------	------	1	------	1	------	1
Bacteriological—food	2	1	------	------	1	1	1•	2
Chemical—food	2	1	8	1	2	8	------	2
Chemical—drugs	------	1	8	1	2	8	------	2•
Physiological—drugs	------	1	------	------	------	------	------	------
Bacteriological—milk	1	1	------	1, 2	1, 2	1	1	1
Chemical—milk	1	1	8	1, 2	2	8	1	2
Participates in indemnities for condemned dairy animals	2	------	2	2	2	2	2	2
Renders additional service not covered in this classification	2	------	------	1	------	------	------	------

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities for food and drug control in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory				
	Wyoming	Alaska	Hawaii	Puerto Rico	Virgin Islands
Promulgates and/or enforces State laws, rules, and regulations concerning one or more activities covered in this section	2	1	1	1, 10	1
Promotes local programs of control	2	1	1	1	-
Conducts educational programs	-	-	-	-	-
Supervises and/or provides consultation service to local organizations	2	1 [b]	1	1	-
Distributes and/or administers financial grants-in-aid to local health units for food and drug control	-	-	-	-	-
Operates a direct service program:					
Licenses and/or periodically inspects—					
Bakeries	-	1	-	-	1
Confectioneries	-	1	-	-	-
Ice cream, butter, and cheese factories	-	1	1	-	-
Bottling plants	-	1	-	-	-
Cold storage warehouses	-	-	1	1	-
Slaughterhouses	2	-	-	1	1
Other and/or unspecified food manufacturing, packing, and sales establishments	-	1	1	1	-
Hotels	-	1	1	1	-
Food dispensing establishments	2	1	1	1	-
Dairy farms	2 [e], 4	1	1, 2	1, 2	1, 2
Pasteurization plants	2 [e]	1	1	1	1
Shellfish production facilities (growing areas, storage systems, shucking and packing plants)	-	1	-	-	-
Drug manufacturing plants, stores, and/or distributors	-	-	1	1	-
Inspects for—					
General sanitation and cleanliness of premises and equipment	2	1	1	1	1
Health of employees	2	1 [b]	1	1	1
Purity, quality, and condition of food or drug product handled; misbranding; mislabeling	2	1	1	1	-
False advertising claims	-	-	-	1	-
Sale or distribution of narcotic drugs	-	-	-	-	-
Water supply, plumbing, toilets, and/or sewage-disposal facilities	2	1	1	1	-
Health of dairy herds	4	-	2	1, 2	2
Construction and operation of pasteurization plants	-	1	1	1	1
Other purposes not covered in this classification	2	-	1	1	-
Collects samples of suspicious products	2	-	1	1	-
Provides facilities for laboratory analysis—					
Bacteriological—water (drinking, dishwashing solutions, shellfish areas)	1	1	1	1	-
Bacteriological—food	-	-	1	1	-
Chemical—food	-	-	1	1	-
Chemical—drugs	-	-	1	1	-
Physiological—drugs	-	-	-	-	-
Bacteriological—milk	1 [e]	1	1	1	-
Chemical—milk	8	-	1	1	-
Participates in indemnities for condemned dairy animals	4	-	-	-	-
Renders additional service not covered in this classification	2			-	-

*Code:
1. Department of health
2. Department of agriculture, agriculture and industries, agriculture and inspection, agriculture and markets, labor and agriculture, commissioner of agriculture, dairy, and food, etc
3. Dairy and food commission, dairy commission, State dairy department, hotel and restaurant commission, hotel and restaurant board
4. Commission on domestic animals, livestock sanitary board, State veterinarian, etc.
5. Department of labor, industrial relations, labor and industry, State labor commission, industrial commissioner
6. Department of conservation
7. Board of pharmacy
8. Independent State laboratory, State laboratory department, State chemist, State toxicologist
9. State university or college
10. Other departments or offices of State government

**Activities herein described pertain to general food and drug control, to supervision of hotels and restaurants, to shellfish sanitation, and to milk control—including sanitation and eradication of bovine tuberculosis and Bang's disease.

[a] The department of health is really a division (Idaho) and bureau (Maine) of public health, subordinate to the department of public welfare (Idaho) and the department of health and welfare (Maine).

[b] Service chiefly advisory.

[c] As part of grant-in-aid to local health units for general health work.

[d] In absence of local service.

[e] Has authority, but little is done.

[f] Temporarily no State program.

[g] Considers health of employees but makes no thorough check.

[h] Service voluntary because agency having authority for this function is inactive.

In some instances the language of the State food and drug law is vague enough to cause complete uncertainty as to who should be responsible for solution of a specific problem. A slightly different circumstance, yet an equally restrictive one, is that described above in which the legally responsible department of State government is given no appropriation for operation.

Like program content and assignment of regulatory responsibility, methods of food and drug control may also be described as miscellaneous. A resumé of the measures taken appears in table 4. If direct service is provided by the State agency, the State's function may include licensing, registration, or certification of establishments or of products. Such licensure may entail observance of a strict sanitary code in one State, while in the neighboring State it represents little more than the collection of inspection fees. Direct State service sometimes covers collection and bacteriological and/or chemical laboratory analysis of samples, followed by removal from sale or destruction of food or drug stocks if necessary. Under other circumstances, it means periodic inspection only.

Even the purpose of inspections is not constant for all States. Such inclusive observations as general sanitation of premises, sanitation of equipment, and general cleanliness of employees are almost always noted, but the presence of screens, methods of ventilation, condition of plumbing, bacterial counts on utensils and glassware, construction of walls and floors, and the like, are less likely to be observed by the inspectors of a number of States. A check on the health of employees varies from the most superficial glance to a thorough physical (including laboratory) examination or rigid requirement that the employee possess a certificate of recent physical examination by a physician. Approval of water supplies and sewage disposal facilities for establishments not connected with municipal conveniences sometimes falls within the province of food and drug, or hotel and restaurant inspectors; more often it is a service delegated to the engineering staff of the health department. In this connection, it should be said that tourist camps have some characteristics in common with hotels and that their control might be expected to be treated in the same section of the report. However, since the items covered in tourist camp supervision are largely restricted to water supplies and sewage disposal facilities, these establishments were covered in the preceding section of this report.

It is recognized, of course, that some of the variation in items covered in inspection is based upon the particular type of food or drug establishment under consideration. From table 4 it is impossible to link the purpose of inspection with the specific type of premises visited, but, broadly speaking, it might be said that general sanitation and cleanliness of premises and equipment; methods of handling or dis-

playing food; cleanliness of employees; condition of water supply, plumbing, and sewage disposal facilities; and practices of garbage disposal are pertinent to practically every food business covered. On the contrary, examination of the purity, quality, and state of the food itself is reserved largely for those places handling types of food which are likely to deteriorate rapidly or to become polluted from careless methods employed n preparation. Cream-filled bakery goods, manufactured dairy products (ice cream, butter, and cheese), delicatessen products, and uncured meats are examples of food of this class. Retail groceries, markets, and drug stores are the sources from which are sought misbranded and mislabeled canned, bottled, and packaged foods and drugs. Finally, the health of milk handlers, shellfish handlers, bakery employees, and restaurant employees appears to have a more direct bearing upon the public health than does the physical condition of other types of food handlers.

State control of fluid milk involves certain specialized procedures which are not entirely applicable to general food and drug control. More specifically, a safe milk supply is the product of two distinct types of service, namely, sanitation and eradication of bovine tuberculosis and Bang's disease. Sanitary control involves conditions under which the milk is produced on the dairy farm as well as methods of pasteurization and distribution. Much conflict appears to exist between the departments of agriculture and health concerning administration of this element of the milk control program. According to one system, it is the function of the health department to introduce grading and rating techniques based upon special surveys of milk sheds and to promote adoption of a suitable milk ordinance in as many local areas as possible. Thereafter, control of the sanitary quality of milk produced in those sections of the State becomes a health department responsibility, while the department of agriculture maintains jurisdiction in the remaining territory. By another plan, the health department exercises authority over that portion of the State having organized local health service, while the department of agriculture operates in the unorganized sections. A third arrangement is that whereby supervision of dairy farms is delegated to the department of agriculture and control of pasteurization is a health department problem. Frequently the health department prefers to depend upon local personnel for routine inspectional service, thus reserving the limited State staff for promotional, educational, consultatory, and supervisory activities.

In reviewing the reports of the several types of agencies it is apparent that State health departments stress the health aspects of milk sanitation, whereas departments of agriculture emphasize economic considerations.

Activities for eradication of diseases among dairy herds which are transmissible to man are practica ly standardized inasmuch as there is always Federal participation in this phase of milk control. As a rule, State veterinarians assist in testing dairy herds for bovine tuberculosis and Bang's disease and the State shares in payment of indemnities for reactors which are ordered destroyed. In some areas, Bang's disease programs are still being conducted on a voluntary basis, but tuberculin testing is done on a State-wide schedule in every instance. There is some difference, too, in the State agency charged with this function The department of agriculture operates in three-fifths of the States, and a special livestock sanitary board or domestic animals commission in nearly all of the remainder.

Cert fication of the sanitary quality o. shellfish is another branch of food control which involves rather special procedures. As previously indicated, less than half of the States produce shellfish; nevertheless, for these particular States, shellfish sanitation is an important public health activity. Furthermore, it is predominantly a health department activity inasmuch as only two States have control programs in which the health department fails to participate, either exclusively or in cooperation with another State agency, notably the department of conservation. Activities engaged in with more or less uniformity as a basis for certification include inspection of growing areas of shellfish, of floats, and of storage, shucking, and packing plants; laboratory analysis of samples of shellfish and of the overlying waters; and closing of condemned areas. Sanitation of shel fish-producing waters is often covered by activities for prevention of general stream pollution. Because of the ease with which certain diseases may be transmitted through shellfish, more rigid requirements are apt to be established regarding the health of shellfish handlers than of general food handlers.

MISCELLANEOUS SANITATION ACTIVITIES

As the scope of sanitation has broadened, new fields of activity have been opened. Table 5 indicates some of the miscellaneous sanitation measures engaged in by State agencies of various types. Only the methods most frequently employed for handling these varied problems have been tabulated.

Recognition of the relationship which exists between housing and health has led to some effort toward housing control by 20 State governments. State participation in the control of water supplies and sewage disposal at private homes has already been discussed. Other items of concern are proper lighting, ventilation, fire prevention, elec-

trical wiring, screening, space allowance, and general sanitation. The authority of relatively few States extends to all of these items or to all types of dwellings. In 6 of the 20 jurisdictions referred to, only buildings which, because of their purpose, constitute fire hazards are subject to State regulation or correctional measures. Authority to order repairs and improvements or to condemn and raze buildings classed as unfit for human habitation is based upon structural defects or fire hazards. Four other States limit most of their activities to dwellings in cities of certain size or to apartments or tenements housing more than two families. Surveys of substandard dwellings are sometimes made as the first approach to solution of the housing problem. Agencies which participate in housing control are: State housing boards, or alley-dwelling authorities, State fire marshals, departments of labor, and, occasionally, departments of health. State housing codes are in effect in 13 jurisdictions, but as a rule these codes apply only to incorporated areas or to cities of specified size. Operation of "model housing" developments and relocation of families moved from condemned dwellings has been undertaken by only 2 States.

In practically all States some items of plumbing control fall within health department supervision, since the installation and maintenance of safe plumbing is so closely allied with sanitation of water supplies and sewage disposal facilities. At the same time, operation of plumbing inspection programs as a distinct enterprise is reported by 16 health departments and 3 boards of plumbing commissioners or examiners. Twenty-one States have adopted plumbing codes, some of which apply to cities of certain size, to public buildings, or to installations on public water systems only. Approval of plans or issuance of permits for new installations, routine plumbing inspections, and training of local inspectors are the several means by which control is exercised. State licensing or certification of plumbers is practiced in 16 jurisdictions. This phase of the program is more likely to be the function of the board of plumbing examiners than of the health department.

Reduction of smoke, fumes, and disagreeable odors is regarded primarily as a nuisance abatement procedure. Through their broad powers to abate nuisances, nine health departments extend their authority to ordering correction of the cause of excessive smoke, fumes, or odors. Occasionally a department of labor, independent department of engineering, or department of public utilities functions in a similar capacity. As a rule, this problem is handled on an individual case basis, the State agency furnishing technical information and recommendations following investigation of specific situations.

TABLE 5.—*Department of State government* responsible for miscellaneous sanitation activities in each State and Territory, the District of Columbia, and the Virgin Islands*

Activity	State or Territory							
	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia
HOUSING CONTROL:								
Has regulatory authority for housing control	8 [b]	------	8	4	------	------	------	15
Makes surveys to determine the number of substandard dwellings which are occupied	------	------	------	4	1	------	------	7
Orders repairs and improvements, condemns, and/or razes buildings	8 [b]	------	8	4	------	------	------	1, 6, 7
Approves plans for new dwellings	------	------	8	4	------	------	------	6
Operates "model housing" developments	------	------	------	------	------	------	------	7
Serves in an advisory capacity only	------	------	------	------	------	------	------	------
PLUMBING CONTROL:								
Has regulatory authority for plumbing control	------	------	------	------	1	1	------	15
Approves plans or issues permits for new plumbing	------	------	------	------	1	------	------	------
Inspects plumbing installations	------	------	------	------	1	------	------	6
Trains and/or approves local plumbing inspectors	------	------	------	------	------	------	------	------
Certifies or licenses plumbers	10	------	------	------	------	------	------	10
Serves in an advisory capacity only	------	------	------	------	------	------	1	------
SMOKE, FUMES, AND ODORS CONTROL:								
Has authority to order elimination of smoke, fumes, and odors under nuisance abatement power	------	------	------	1	4	------	------	15
Restricts location of industrial plants that give rise to disagreeable fumes and odors	------	------	------	------	------	------	------	15
Furnishes technical information and recommendations following investigation of specific problems	------	------	------	1	1	------	------	6
Serves in an advisory capacity only	------	------	------	------	------	------	------	------
CONTROL OF GARBAGE COLLECTION AND DISPOSAL:								
Has regulatory authority over garbage collection and disposal under nuisance abatement power	------	------	---	------	------	1	------	15
Approves construction plans for garbage disposal plants	------	------	------	------	------	1	------	------
Inspects garbage disposal plants	------	------	------	------	------	------	------	------
Participates in collection and disposal of garbage	------	------	------	------	------	------	------	6
Serves in an advisory capacity only	1	------	------	1	1 [f]	------	1	------
RODENT CONTROL:								
Has regulatory authority for rodent control	1	1, 3	------	------	------	------	------	------
Conducts educational programs for rat extermination and rat proofing	1	------	------	1	------	------	------	------
Makes studies in individual communities and assists in planning effective control programs	------	------	------	1	------	------	------	------
Serves in an advisory capacity only	------	------	------	------	------	------	------	------
MALARIA MOSQUITO CONTROL (covered in chapter II of this series).								
PEST MOSQUITO CONTROL:								
Engages in pest mosquito control through antimalaria measures only	1	------	1	1	------	------	------	6, 15
Has regulatory authority for control of pest mosquitoes as such	------	------	------	------	------	11	15	------
Makes routine inspections or special investigations of prevalence and distribution of mosquitoes	------	------	------	------	------	------	5	------
Participates in drainage and/or larvicidal projects for control of pest mosquitoes	------	------	------	------	------	15	15	------
Serves in an advisory capacity only	------	------	------	------	------	------	------	------
SWIMMING POOL SANITATION:								
Establishes and/or enforces standards of construction and maintenance of swimming pools	1	1	1	1	1	1	1	1
Approves plans and specifications for construction	1 [f]	------	1	------	1 [f]	1	------	1
Periodically inspects swimming pools	------	1	1	1	1	1	1	1
Serves in an advisory capacity only	------	------	------	------	------	------	------	------
SANITATION OF BARBER SHOPS AND BEAUTY PARLORS:								
Periodically inspects barber shops for sanitation of premises and equipment	------	------	12	12	12	12	1 [a]	12
Periodically inspects beauty parlors for sanitation of premises and equipment	------	------	13	------	13	1	1 [b]	13
Certifies or licenses barbers	------	12	12	12	12	12	12	12
Certifies or licenses cosmeticians	------	13	13	13	13	1	------	13

See footnotes at end of table.

TABLE 5.—*Department of State government responsible for miscellaneous sanitation activities in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Florida	Georgia	Idaho [a]	Illinois	Indiana	Iowa	Kansas	Kentucky
HOUSING CONTROL								
Has regulatory authority for housing control				8 [b]	1, 2			
Makes surveys to determine the number of substandard dwellings which are occupied					1	1 [e]		
Orders repairs and improvements, condemns, and/or razes buildings				8 [b f]	1, 8 [b]			
Approves plans for new dwellings					1, 2, 8			
Operates "model housing" developments								
Serves in an advisory capacity only								
PLUMBING CONTROL								
Has regulatory authority for plumbing control	1				1			1
Approves plans or issues permits for new plumbing								1 [d]
Inspects plumbing installations					1 [d]			1 [d]
Trains and/or approves local plumbing inspectors								
Certifies or licenses plumbers	10			14				1
Serves in an advisory capacity only						1		
SMOKE, FUMES, AND ODORS CONTROL								
Has authority to order elimination of smoke, fumes, and odors under nuisance abatement power								
Restricts location of industrial plants that give rise to disagreeable fumes and odors								
Furnishes technical information and recommendations following investigation of specific problems				1				
Serves in an advisory capacity only				1				
CONTROL OF GARBAGE COLLECTION AND DISPOSAL								
Has regulatory authority over garbage collection and disposal under nuisance abatement power	1				1			
Approves construction plans for garbage disposal plants	1					1		
Inspects garbage disposal plants	1				1			
Participates in collection and disposal of garbage								
Serves in an advisory capacity only		1		1				1
RODENT CONTROL								
Has regulatory authority for rodent control		1						
Conducts educational programs for rat extermination and rat proofing		1						
Makes studies in individual communities and assists in planning effective control programs		1						
Serves in an advisory capacity only							1	
MALARIA MOSQUITO CONTROL (covered in chapter II of this series)								
Pest mosquito control								
Engages in pest mosquito control through antimalaria measures only	1			1	1			
Has regulatory authority for control of pest mosquitoes as such								
Makes routine inspections or special investigations of prevalence and distribution of mosquitoes								
Participates in drainage and/or larvicidal projects for control of pest mosquitoes								
Serves in an advisory capacity only							1	
SWIMMING POOL SANITATION								
Establishes and/or enforces standards of construction and maintenance of swimming pools			1	1	1	1	1	
Approves plans and specifications for construction	1	1	1	1	1	1	1	1
Periodically inspects swimming pools	1	1	1	1	1	1	1	
Serves in an advisory capacity only								
SANITATION OF BARBER SHOPS AND BEAUTY PARLORS								
Periodically inspects barber shops for sanitation of premises and equipment	12	12	1	14	12	1	13	12
Periodically inspects beauty parlors for sanitation of premises and equipment	13	13	1	14	13	1	13	12
Certifies or licenses barbers	12	12	14	14	12	1	12	12
Certifies or licenses cosmeticians	13		14	14	13	1	13	12

See footnotes at end of table.

TABLE 5.—*Department of State government responsible for miscellaneous sanitation activities in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Louisiana	Maine [a]	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri
HOUSING CONTROL:								
Has regulatory authority for housing control	8 [b]			7	1, 8 [b]			
Makes surveys to determine the number of substandard dwellings which are occupied	8 [b]							
Orders repairs and improvements, condemns, and/or razes buildings	8 [b]			9				
Approves plans for new dwellings	8			7 [d]				
Operates "model housing" developments				7				
Serves in an advisory capacity only								
PLUMBING CONTROL:								
Has regulatory authority for plumbing control	1	1	1	1, 10	10	1		
Approves plans or issues permits for new plumbing				10 [d]	10 [d]	1		
Inspects plumbing installations	1 [d]	1		10 [d]	10 [d]	1 [d]		
Trains and/or approves local plumbing inspectors	1 [f]	1		10				
Certifies or licenses plumbers	10	10	10	10	10	1		
Serves in an advisory capacity only								1 [f]
SMOKE, FUMES, AND ODORS CONTROL:								
Has authority to order elimination of smoke, fumes, and odors under nuisance abatement power		1		6 [d]				
Restricts location of industrial plants that give rise to disagreeable fumes and odors								
Furnishes technical information and recommendations following investigation of specific problems		1		6 [d]				
Serves in an advisory capacity only								
CONTROL OF GARBAGE COLLECTION AND DISPOSAL:								
Has regulatory authority over garbage collection and disposal under nuisance abatement power	1		1			1	1	
Approves construction plans for garbage disposal plants	1 [f]		1			1		
Inspects garbage disposal plants	1		1					
Participates in collection and disposal of garbage								
Serves in an advisory capacity only				1 [f]	1 [f]			
RODENT CONTROL:								
Has regulatory authority for rodent control	1						15	
Conducts educational programs for rat extermination and rat proofing	1							
Makes studies in individual communities and assists in planning effective control programs	1						15	
Serves in an advisory capacity only						15 [f]		
MALARIA MOSQUITO CONTROL (covered in chapter II of this series).								
PEST MOSQUITO CONTROL:								
Engages in pest mosquito control through antimalaria measures only	1					1, 5	1	
Has regulatory authority for control of pest mosquitoes as such			8					
Makes routine inspections or special investigations of prevalence and distribution of mosquitoes			3, 5	1				
Participates in drainage and/or larvicidal projects for control of pest mosquitoes			3	3				
Serves in an advisory capacity only		1						
SWIMMING POOL SANITATION:								
Establishes and/or enforces standards of construction and maintenance of swimming pools	1	1	1		1	1	1	1
Approves plans and specifications for construction	1	1	1		1	1	1	1
Periodically inspects swimming pools	1	1	1	1	1		1	1
Serves in an advisory capacity only								
SANITATION OF BARBER SHOPS AND BEAUTY PARLORS:								
Periodically inspects barber shops for sanitation of premises and equipment	12	12		12	12	12	1	
Periodically inspects beauty parlors for sanitation of premises and equipment	13	12		13	12	13	1	1
Certifies or licenses barbers	12	12	12	14	12	12	12	12
Certifies or licenses cosmeticians	13	12	13	14		13		1

See footnotes at end of table.

TABLE 5.—*Department of State government responsible for miscellaneous sanitation activities in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina
HOUSING CONTROL:								
Has regulatory authority for housing control					7 [e]		15	
Makes surveys to determine the number of substandard dwellings which are occupied					7 [f]		15	
Orders repairs and improvements, condemns, and/or razes buildings					7 [e]			
Approves plans for new dwellings					7 [d]		15	
Operates "model housing" developments								
Serves in an advisory capacity only			1					
PLUMBING CONTROL:								
Has regulatory authority for plumbing control				1				
Approves plans or issues permits for new plumbing								
Inspects plumbing installations				1 [d]				
Trains and/or approves local plumbing inspectors								
Certifies or licenses plumbers								
Serves in an advisory capacity only			1 [f]				1	
SMOKE, FUMES, AND ODORS CONTROL:								
Has authority to order elimination of smoke fumes, and odors under nuisance abatement power				1				
Restricts location of industrial plants that give rise to disagreeable fumes and odors								
Furnishes technical information and recommendations following investigation of specific problems				1				
Serves in an advisory capacity only			1					
CONTROL OF GARBAGE COLLECTION AND DISPOSAL:								
Has regulatory authority over garbage collection and disposal under nuisance abatement power	1						1	
Approves construction plans for garbage disposal plants								
Inspects garbage disposal plants								
Participates in collection and disposal of garbage								
Serves in an advisory capacity only			1	1		1		
RODENT CONTROL:								
Has regulatory authority for rodent control			1					1
Conducts educational programs for rat extermination and rat proofing								1
Makes studies in individual communities and assists in planning effective control programs								1
Serves in an advisory capacity only								
MALARIA MOSQUITO CONTROL (covered in chapter II of this series).								
PEST MOSQUITO CONTROL:								
Engages in pest mosquito control through antimalaria measures only								
Has regulatory authority for control of pest mosquitoes as such			1		15			
Makes routine inspections or special investigations of prevalence and distribution of mosquitoes			1		15			
Participates in drainage and/or larvicidal projects for control of pest mosquitoes					15			
Serves in an advisory capacity only								
SWIMMING POOL SANITATION:								
Establishes and/or enforces standards of construction and maintenance of swimming pools	1		1	1		1	1	1
Approves plans and specifications for construction	1	1	1	1		1	1	1
Periodically inspects swimming pools	1	1	1	1			1	
Serves in an advisory capacity only					1			
SANITATION OF BARBOR SHOPS AND BEAUTY PARLORS:								
Periodically inspects barber shops for sanitation of premises and equipment	12	1	12	12	12			
Periodically inspects beauty parlors for sanitation of premises and equipment	13	1	13	13	13			
Certifies or licenses barbers	12	1	12	12	12	12		12
Certifies or licenses cosmeticians	13	1	13	13	13	13		13

See footnotes at end of table.

TABLE 5.—*Department of State government responsible for miscellaneous sanitation activities in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota
	State or Territory							
HOUSING CONTROL:								
Has regulatory authority for housing control		4 [b], 8 [d]	8 [b]		1			
Makes surveys to determine the number of substandard dwellings which are occupied					1			
Orders repairs and improvements, condemns and/or razes buildings		8 [b]	8 [b]					
Approves plans for new dwellings		4 [d]			1			
Operates "model housing" developments								
Serves in an advisory capacity only								
PLUMBING CONTROL:								
Has regulatory authority for plumbing control		1		1				
Approves plans or issues permits for new plumbing		1 [d]						
Inspects plumbing installations		1 [d]						
Trains and/or approves local plumbing inspectors								
Certifies or licenses plumbers				1				
Serves in an advisory capacity only	1		1					
SMOKE, FUMES, AND ODORS CONTROL:								
Has authority to order elimination of smoke, fumes, and odors under nuisance abatement power	1				1			
Restricts location of industrial plants that give rise to disagreeable fumes and odors					1			
Furnishes technical information and recommendations following investigation of specific problems	1				1			
Serves in an advisory capacity only								
CONTROL OF GARBAGE COLLECTION AND DISPOSAL:								
Has regulatory authority over garbage collection and disposal under nuisance abatement power			1		1	1		1
Approves construction plans for garbage disposal plants		1 [f]						1
Inspects garbage disposal plants								
Participates in collection and disposal of garbage								
Serves in an advisory capacity only	1			1				
RODENT CONTROL:								
Has regulatory authority for rodent control								
Conducts educational programs for rat extermination and rat proofing								
Makes studies in individual communities and assists in planning effective control programs							1	
Serves in an advisory capacity only								
MALARIA MOSQUITO CONTROL (covered in chapter II of this series).								
PEST MOSQUITO CONTROL:								
Engages in pest mosquito control through antimalaria measures only		1		1			1	
Has regulatory authority for control of pest mosquitoes as such						3		
Makes routine inspections or special investigations of prevalence and distribution of mosquitoes						3		
Participates in drainage and/or larvicidal projects for control of pest mosquitoes						3		
Serves in an advisory capacity only	1							
SWIMMING AND SANITATION:								
Establishes and/or enforces standards of construction and maintenance of swimming pools	1	1	1	1	1	1	1	1
Approves plans and specifications for construction	1	1 [d]	1	1	1	1	1	1
Periodically inspects swimming pools	1		1	1	1	1	1	
Serves in an advisory capacity only								
SANITATION OF BARBER SHOPS AND BEAUTY PARLORS:								
Periodically inspects barber shops for sanitation of premises and equipment	12	12		12		1	1	12
Periodically inspects beauty parlors for sanitation of premises and equipment	13	13	13	13		1	1	13
Certifies or licenses barbers	12	12	12	12	15	1	12	12
Certifies or licenses cosmeticians	13	13	13	13	15	1	13	13

See footnotes at end of table.

TABLE 5.—*Department of State government responsible for miscellaneous sanitation activities in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin
HOUSING CONTROL:								
Has regulatory authority for housing control								4[d]
Makes surveys to determine the number of substandard dwellings which are occupied								4[d]
Orders repairs and improvements, condemns, and/or razes buildings		4[b]						4[d]
Approves plans for new dwellings								4[d]
Operates "model housing" developments								
Serves in an advisory capacity only					1			
PLUMBING CONTROL:								
Has regulatory authority for plumbing control			10	1				1
Approves plans or issues permits for new plumbing				1				
Inspects plumbing installations				1				1[e]
Trains and/or approves local plumbing inspectors								1
Certifies or licenses plumbers			14					1
Serves in an advisory capacity only		1						
SMOKE, FUMES, AND ODORS CONTROL:								
Has authority to order elimination of smoke, fumes, and odors under nuisance abatement power						1, 3, 4		1
Restricts location of industrial plants that give rise to disagreeable fumes and odors								1
Furnishes technical information and recommendations following investigation of specific problems						1		1
Serves in an advisory capacity only					1			
CONTROL OF GARBAGE COLLECTION AND DISPOSAL:								
Has regulatory authority over garbage collection and disposal under nuisance abatement power		1				1		1
Approves construction plans for garbage disposal plants		1						1
Inspects garbage disposal plants								1
Participates in collection and disposal of garbage								
Serves in an advisory capacity only					1			
RODENT CONTROL:								
Has regulatory authority for rodent control								
Conducts educational programs for rat extermination and rat proofing								
Makes studies in individual communities and assists in planning effective control programs		1						
Serves in an advisory capacity only								
MALARIA MOSQUITO CONTROL (covered in chapter II of this series).								
PEST MOSQUITO CONTROL:								
Engages in pest mosquito control through antimalaria measures only		1			1			1
Has regulatory authority for control of pest mosquitoes as such								
Makes routine inspections or special investigations of prevalence and distribution of mosquitoes								
Participates in drainage and/or larvicidal projects for control of pest mosquitoes								
Serves in an advisory capacity only								
SWIMMING POOL SANITATION:								
Establishes and/or enforces standards of construction and maintenance of swimming pools	1	1	1	1		1	1	1
Approves plans and specifications for construction	1	1	1	1		1	1	1
Periodically inspects swimming pools		1	1	1		1	1	1
Serves in an advisory capacity only								

See footnotes at end of table.

TABLE 5.—*Department of State government responsible for miscellaneous sanitation activities in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin
SANITATION OF BARBER SHOPS AND BEAUTY PARLORS:								
Periodically inspects barber shops for sanitation of premises and equipment	12	12	------	12	------	------	1	1
Periodically inspects beauty parlors for sanitation of premises and equipment	13	13	------	13	------	------	1	1
Certifies or licenses barbers	12	12	14	12	------	14	12	1
Certifies or licenses cosmeticians	13	13	14	13	------	14	12	1

Activity	State or Territory				
	Wyoming	Alaska	Hawaii	Puerto Rico	Virgin Islands
HOUSING CONTROL:					
Has regulatory authority for housing control	------	------	1	1	------
Makes surveys to determine the number of substandard dwellings which are occupied	------	------	1	1	------
Orders repairs and improvements, condemns, and/or razes buildings	------	------	1	1	------
Approves plans for new dwellings	------	------	1	1, 9	------
Operates "model housing" developments	------	------	------	------	------
Serves in an advisory capacity only	------	------	------	------	------
PLUMBING CONTROL:					
Has regulatory authority for plumbing control	------	------	1	1	15
Approves plans or issues permits for new plumbing	------	------	1	1	------
Inspects plumbing installations	------	------	------	1	------
Trains and/or approves local plumbing inspectors	------	------	------	------	------
Certifies or licenses plumbers	------	------	10	10	------
Serves in an advisory capacity only	------	1	------	------	------
SMOKE, FUMES, AND ODORS CONTROL:					
Has authority to order elimination of smoke, fumes, and odors under nuisance abatement power	------	------	1	1	------
Restricts location of industrial plants that give rise to disagreeable fumes and odors	------	------	1	------	------
Furnishes technical information and recommendations following investigation of specific problems	------	------	1	6	------
Serves in an advisory capacity only	------	------	------	------	------
CONTROL OF GARBAGE COLLECTION AND DISPOSAL:					
Has regulatory authority over garbage collection and disposal under nuisance abatement power	------	1	1	1	1, 15
Approves construction plans for garbage disposal plants	------	------	------	------	------
Inspects garbage disposal plants	------	------	------	1	------
Participates in collection and disposal of garbage	------	------	------	------	15
Serves in an advisory capacity only	1	------	------	------	------
RODENT CONTROL:					
Has regulatory authority for rodent control	------	------	1	1	------
Conducts educational programs for rat extermination and rat proofing	------	------	1	------	------
Makes studies in individual communities and assists in planning effective control programs	------	------	1	------	------
Serves in an advisory capacity only	------	------	------	------	------

See footnotes at end of table.

TABLE 5.—*Department of State government responsible for miscellaneous sanitation activities in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory				
	Wyoming	Alaska	Hawaii	Puerto Rico	Virgin Islands
MALARIA MOSQUITO CONTROL (covered in chapter II of this series).					
PEST MOSQUITO CONTROL:					
Engages in pest mosquito control through antimalaria measures only			1	1	1
Has regulatory authority for control of pest mosquitoes as such					
Makes routine inspections or special investigations of prevalence and distribution of mosquitoes					
Participates in drainage and/or larvicidal projects for control of pest mosquitoes					
Serves in an advisory capacity only					
SWIMMING POOL SANITATION:					
Establishes and/or enforces standards of construction and maintenance of swimming pools	1		1	1	
Approves plans and specifications for construction			1	1	
Periodically inspects swimming pools	1		1	1	
Serves in an advisory capacity only		1			
SANITATION OF BARBER SHOPS AND BEAUTY PARLORS:					
Periodically inspects barber shops for sanitation of premises and equipment	12	1	1	1	1
Periodically inspects beauty parlors for sanitation of premises and equipment	13	1	1	1	1
Certifies or licenses barbers	12				
Certifies or licenses cosmeticians	13	13	13		

*Code:
1. Department of health
2. Department of welfare, social security, emergency relief, general assistance, etc.
3. Department of agriculture
4. Department of labor, labor and industry, labor and immigration, industrial relations, etc.
5. State university or college
6. Independent department of engineering, department of public utilities
7. State housing board, State board of tenement house supervision, alley-dwelling authority, etc.
8. State fire marshal
9. Department of public safety, superintendent of security
10. State plumbing board, board of plumbing examiners, etc.
11. Mosquito control board
12. Barbers' examining board, barbers' sanitary commission, board of barbers and hairdressers, etc.
13. Board of cosmetic therapy, State board of beauty culture examiners, etc.
14. Board of registration and education, department of law enforcement, department of civil service and registration
15. Other departments of State government

[a] The department of health is really a division (Idaho) and bureau (Maine) of public health, subordinate to the department of public welfare (Idaho) and the department of health and welfare (Maine).

[b] Insofar as fire hazards are concerned.

[c] Two agencies of this classification serve in this capacity.

[d] Restricted to special conditions: To dwellings of more than two families; to public and semipublic buildings; to towns of 5,000 or more population; to first- and second-class cities; to State-owned or State-used buildings; to hospitals, hotels, etc.

[e] In the absence of local service; occasionally.

[f] Upon request or complaint.

Twenty-two States report some jurisdiction over the disposition of garbage. This number does not take into account 17 additional health departments which offer advisory service only. For the most part, State activity for garbage collection and disposal is centered in regulatory control, intimate supervision being delegated to local health units. In a few instances, however, State engineers examine and approve construction plans for garbage disposal plants, and personnel of State agencies inspect their operation. In others, inspec-

tions of sanitary fills are included as a function of the State staff. Only a few departments stress the association between proper garbage disposal and prevention of trichinosis, but regulated disposal is recognized as an important factor in rodent control.

Rodent control as a public health measure is an outgrowth of campaigns for reduction and eventual eradication of plague and endemic typhus fever. Only 12 States report official action leading to rodent control, and among these the methods selected are variant. In several jurisdictions demonstration projects have been conducted to determine the relative effectiveness of different rodent extermination measures. To a large extent State agencies function in a promotional, educational, or advisory capacity. Members of the State staff make studies in individual communities and on the basis of their findings help organize local control programs for immediate rat extermination and permanent rat-proofing of buildings.

Operations of State agencies for malaria control were described in chapter II of this series.[5] However, since the engineering features involved in the control of this communicable disease represent an important activity of several State sanitary engineering divisions, it seems appropriate at this point to refer again to State activities in connection with drainage and larvicidal operations for the eradication of anopheline mosquitoes. Nearly half of the States make investigations of suspected anopheline breeding areas, while somewhat less than a third of them participate in corrective measures. Correction largely consists of constructing or repairing drainage ditches and—where drainage is impractical—of applying larvicides to the surface of bodies of water. For the most part, the exact function of the State agency in these correctional projects is developmental, promotional, supervisory, and advisory. Indeed, though actual construction activities usually represent a joint local and Federal project, initiation and guidance of the performance rests with the State. The health department is the agency primarily responsible, but occasionally agricultural experiment stations, boards of entomology, State universities or colleges, and independent departments of engineering cooperate.

It was pointed out in chapter II [6] that measures for the control of pest mosquitoes are apt to be included in the general malaria program and that only nine States list pest mosquito control as a separate entity. It is the activities of these nine States—and of a tenth, which extends its pest mosquito program beyond its antimalaria measures—that are under discussion at this point. State participation in pest mosquito control as such is limited principally to investigation of prevalence and distribution of the insects and to supervision of local

[5] See text footnote [2].
[6] See text footnote [2].

drainage and/or larvicidal projects for their destruction. Several States actively engage in such projects, but the more general policy is for the State agency to supervise and make recommendations. In addition to health departments, mosquito control boards, State entomologists, and State agricultural experiment stations participate in one way or another in pest mosquito control.

Among the branches of sanitation which have been categorized as miscellaneous, that which pertains to swimming pools is perhaps the most uniformly administered. Swimming pool sanitation is concentrated within the health department, and all but eight of them require that pools be constructed and maintained according to established standards. In about three-fourths of the States, approval of plans and specifications is required prior to construction, while in practically the same number, periodic inspection of the operation of pools is a responsibility of health department personnel. Irregularity typifies the frequency of inspection.

Sanitation of barber shops and beauty parlors is promoted chiefly through inspectional service, although licensure of the operators is another outstanding control feature which a few States depend upon exclusively, and more combine with inspections. Items covered in inspection may be grouped under the broad designation of cleanliness of premises and equipment. General operating procedures such as use of individual combs, towels, and the like, and methods of sterilization are also observed. Inspection is a health department function in about one-fourth of the States, while it is the duty of independent boards of barber and cosmetician examiners in about half of them. Even among this latter group, however, it is not unusual for the health department either to establish or approve the rules and regulations governing sanitation. In the remaining quarter of the jurisdictions inspection of barber shops and beauty parlors is not a State activity except as it is included under the broad power of the health department to abate nuisances and general insanitary conditions.

EXPENDITURES FOR SANITATION

Wide diversity among the States in number, kind, and intensity of activities which make up their respective programs of sanitation has been emphasized throughout this discussion. Likewise, the dispersion of such services among numerous agencies of State government has been delineated. In view of these combined circumstances, it is obvious that a complete and accurate expenditure figure, which might serve as an indicative measure of the extent of over-all State efforts toward public health sanitation, is difficult if not impossible to determine. For instance, laboratory service is a vital part of all effective sanitation programs; yet expenditures for laboratories also

cover some services which are not allied with sanitary engineering; consequently, it was decided that this item should be reported separately and not included in expenditures for sanitation. Furthermore, sanitary engineers are apt to be employed on the staffs of State health district offices, but financial figures for operation of these State health districts are not broken down according to services rendered by the personnel thereof. Finally, as pointed out earlier, financial aid given local health units by State health departments includes some allowance for sanitation activities but the exact proportion is immeasurable.

Besides the aforementioned factors, the practice of including different items under like terminology adds confusion to the expenditure picture. As an example, expenditures for such miscellaneous sanitation activities as housing control, rodent control, plumbing control, or sanitation of barber shops and beauty parlors are sometimes shown separately, but more often included under general sanitation. Likewise, in some States expenditures for milk sanitation are included under the broad heading "sanitary engineering." In a neighboring State only water and sewerage may be covered by this designation and milk work possibly is included under sanitation of foods. Still a third State is apt to report its entire program of food control, which may also include hotel and restaurant sanitation, under one common listing.

Stated briefly, there is no accepted pattern of reporting expenditures for sanitation activities, and the absence of an entry for any particular type of service by no means implies that such service is not provided by the State. More often than not it is lumped with some related activity. Therefore, while determination of the cost of each particular branch of sanitation is most desirable, inconsistent accounting practices make such analysis wholly unreliable. Summation of the many inconsistencies in recording and reporting practices results in the conclusion that available data represent the best approximation possible instead of absolutely exact expenditures for sanitation, and that the figures submitted lend themselves to gross statements for over-all endeavor rather than to break-down by the specific type of service afforded.

With these qualifications, it is believed that the figures obtained, crude though they may be, are more nearly representative of the actual situation than any which appear in the literature at the present time. This statement is based on the fact that the survey herewith reported includes expenditures of all State agencies participating in sanitation activities, whereas those made previously were confined to services of the health department only.

By including every expenditure item designated for any activity covered by this article it is found that State agencies spend a total of approximately 16¾ million dollars annually for sanitation activities.

It is interesting to note that only one-fourth of this amount represents health department outlay. In fact, the health department does not even rank highest from the standpoint of single-agency expenditures for activities falling within the scope of this discussion; it is surpassed by the department of agriculture. This is a particularly significant observation when it is linked with the knowledge that, to a large extent, departments of agriculture are prone to place health considerations secondary to economic concern in their administration of the several programs under study. Another agency which reported an outstandingly high expenditure for sanitation is the independent department of engineering which functions in the District of Columbia. It must be borne in mind, however, that this figure is somewhat atypical inasmuch as control of water, sewerage, and other sanitation problems in the District represents direct municipal service rather than State administrative control.

As to source of the funds which are designated as disbursements by State agencies for sanitation, those derived from State appropriating bodies constitute about seven-eighths of the total, and thus far outrank those obtained from any other source. License and inspection fees and Federal grants-in-aid, principally from funds made available under Title VI of the Social Security Act of 1935, make up the remainder of the sum in almost equal proportions.

There is marked variation among the States in both total and per capita expenditures for sanitation. Total expenditures range from 10 thousand to over 4 million dollars. When converted to expenditures per capita, the range is defined by extremes of less than two cents and over six dollars. The abnormally high expenditure, from both total and per capita standpoints, was reported by the District of Columbia where the sanitation program includes extensive direct municipal service. The average per capita expenditure for the Nation as a whole is \$0.125, while that for the State occupying the median position is \$0.112. From table 6 may be determined total and per capita expenditures of each State for its complete sanitation activities. This tabulation shows also that per capita expenditures for sanitation of the middle 50 percent of the States range from fifteen cents to five cents.

Investigation of the effect of a State's wealth upon the amount it expends for sanitation reveals a close relationship. By arraying the States in descending order of per capita income payments,[7] grouping them into quarters, and computing for each level the median per capita expenditure for State sanitation activities, it is found that the resulting figures reflect the position of the group which they represent. In other words, the median State of the wealthiest quarter

[7] Martin, John L., National Income Division, Department of Commerce: Income Payments to Individuals by States, 1929-39. Survey of Current Business, October 1940.

spends $0.131 per capita, while corresponding figures for the other three brackets are $0.118, $0.083, and $0.035 in accordance with diminishing wealth of the States.

Location of a State within a particular geographic area appears to have some influence upon a State's sanitation expenditures also. Four major divisions of the country, which have previously been established for analysis of public health data[8] form the base for studying influence of this State characteristic. It is recognized, of course, that there is interrelationship between a State's wealth and its geographic location and that the effect of neither of these factors can be regarded as exclusive of the other. In spite of this mutual overlapping which cannot be measured, States of the several geographic locations display differences which are sufficiently great to merit separate attention. When considered as a group, the Northeastern States spend approximately four times as much per capita for sanitation as do those of the Southern area. States of the Central and Western regions occupy intermediate positions, there being relatively little difference in the figures representing expenditure by the median State of each of these geographic sections. The median per capita disbursement for sanitation in each of the established geographic areas is as follows: Northeastern, $0.146; Central, $0.114; Western, $0.093; and Southern, $0.037.

Variability in local sanitation programs which complement State activities is believed to be a third factor which operates in determining the wide range of expenditures by State agencies for sanitation. It is impossible to ascertain the exact weight of supplementary local programs, however, as no investigation was made of services conducted at this level.

Numerous allusions have been made to the expansion, over a period of years, in sanitation programs, which include sanitary engineering and allied activities. Perhaps the most impressive measure of this expansion is found in the increased allotments for the purposes under study. From the earlier edition of Public Health Bulletin 184[9] it is possible to arrive at 1930 cost figures which lend themselves to comparison with those most recently collected for the several categories of service covered by the broad term "sanitation." Certain adjust-

[8] Mountin, Joseph W., Pennell, Elliott H., and Pearson, Kay: The distribution of hospitals and their financial support in southern States. So. Med. J., vol. 33, No. 4, April 1940

The established geographic areas with the States contained therein are as follows:

Northeastern: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia.

Southern: Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas.

Central: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas

Western: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, and California.

[9] See footnote 1.

ments in the two sets of data were necessary, of course, before comparability could be established. In the first place, 1930 financial information pertained to the health department only; consequently, only within this agency could growth of programs be traced. Secondly, it was necessary to exclude the District of Columbia, the Territories of Alaska, Hawaii, and Puerto Rico, and the Virgin Islands from the comparative study because no 1930 figures were reported for these jurisdictions. Finally, several tabulations shown separately in the earlier publication had to be combined before totals corresponding with those compiled from the 1940 data were obtained.

TABLE 6.—*Approximate total and per capita annual expenditures* by all official State agencies for over-all sanitation activities designated as such** in each State and Territory, the District of Columbia, and the Virgin Islands*

State or Territory	Approximate annual expenditure* for over-all sanitation activities designated as such**		State or Territory	Approximate annual expenditure* for over-all sanitation activities designated as such**	
	Total	Per capita		Total	Per capita
Total	$16,757,400	$0.125	Nevada	$32,809	$0.298
			New Hampshire	105,100	.214
Alabama	205,700	.073	New Jersey	520,100	.125
Arizona	41,200	.083	New Mexico	10,000	.019
Arkansas	49,600	.025	New York	1,558,900	.116
California	644,300	.093	North Carolina	116,500	.033
Colorado	74,800	.067	North Dakota	199,100	.310
Connecticut	369,400	.216	Ohio	368,200	.053
Delaware	36,800	.138	Oklahoma	49,400	.021
District of Columbia	4,056,500	6.407	Oregon	99,900	.092
Florida	348,400	.184	Pennsylvania	1,536,100	.155
Georgia	248,100	.079	Rhode Island	97,000	.136
Idaho	42,300	.081	South Carolina	63,500	.033
Illinois	1,031,000	.131	South Dakota	75,400	.117
Indiana	356,000	.104	Tennessee	109,000	.037
Iowa	291,600	.115	Texas	105,600	.016
Kansas	149,400	.083	Utah	61,700	.112
Kentucky	106,300	.037	Vermont	43,200	.120
Louisiana	324,400	.137	Virginia	143,100	.053
Maine	223,000	.263	Washington	202,400	.117
Maryland	77,200	.042	West Virginia	113,200	.060
Massachusetts	705,800	.164	Wisconsin	462,000	.147
Michigan	232,500	.044	Wyoming	26,600	.106
Minnesota	319,800	.115	Alaska	10,300	.141
Mississippi	43,100	.020	Hawaii	126,500	.299
Missouri	173,600	.046	Puerto Rico	124,800	.067
Montana	75,500	.135	Virgin Islands	21,100	.848
Nebraska	149,606	.114			

*Expenditures for the health services considered represent index rather than absolute amounts. Because of variations in fiscal practices, figures cover the most recent year for which information was available at the date of interview. In some instances, because of overlapping and interweaving of activities, estimates were accepted in the absence of precise expenditure records. All funds disbursed by official State agencies for sanitation activities are included, irrespective of their source. State-appropriated moneys constitute about seven-eighths of the total, and the remainder is derived in almost equal proportions from license or inspection fees and Federal grants-in-aid.

**Insofar as they could be separated, figures for sanitation activities include all fields of public health engineering, specifically sanitation of water supplies and sewage disposal facilities and of food and drug supplies (including general food and drug control, hotel and restaurant supervision, shellfish sanitation, milk control, which extends to sanitation and eradication of bovine tuberculosis and Bang's disease), and such miscellaneous activities as swimming pool sanitation, housing and plumbing control, sanitation of barber shops and beauty parlors, garbage collection and disposal, rodent and pest mosquito control, and control of smoke, fumes, and odors. Expenditures for malaria control, including engineering activities, were reported under costs of communicable disease control, chapter II of this series.

Results of the test applied show that, for the country as a whole, current sanitation activities of health departments cost more than two and one-third times the amount expended for like purposes in 1930.

Within individual States, all but 4 reported increased expenditures. Indeed, a decade ago 10 State health departments listed no expenditure for sanitation as a separate entity. In 1940, every one set aside a specific fund for such work. In the 34 States where expansion has taken place, sanitation programs cost from one and one-tenth to over nine times as much at the end of the 1930–1940 decennary as at the beginning. Increases in expenditures are particularly noticeable among the Western States.

DISCUSSION

The wide range of activities which are encompassed by sanitation is largely responsible for the complexity of organization and function which distinguishes this branch of the total public health program. However, this complexity is not particularly manifest insofar as the two main objectives of the public health engineer are concerned, since programs for protection of public water supplies and prevention of stream pollution from improper methods of sewage and waste disposal are relatively well-defined. Usually the health department is the State agency responsible for attainment of these two objectives, though in some instances several other departments of State government—most notably the State university or college and special sanitary authorities or water boards—participate in certain features of the program. Engineers of the State health departments' central and district staffs operate through exercising regulatory authority, promoting extension of municipal water and sewerage systems, reviewing and approving plans for new and enlarged plants and systems, training plant operators, inspecting the operation of plants, and periodically testing samples obtained therefrom. The extent and intensity of inspectional service furnished is dependent upon size of the State staff, as well as upon the amount of direct service which can be delegated to local health units.

Control of semipublic water supplies and sewerage systems by State health departments is both less concentrated and less uniform than the supervision maintained over municipal facilities. While the regulatory authority of all States extends to water and sewerage of camps and, of most of them, to schools, industries, or other institutions, the direct service afforded these semipublic installations by State personnel is apt to be somewhat limited. In most jurisdictions, the State agency functions through its local subdivisions for this purpose and acts as supervisor and consultant to local personnel. Departments of labor and education, respectively, participate in industrial and school sanitation in a number of States.

Control of home sanitation beyond the point of offering direct advice and distributing recommended standards and specifications for

private wells, springs, and sewage disposal facilities is rarely undertaken at the State level. However, the State agency does promote and supervise local programs of home sanitation, foremost among which are Work Projects Administration enterprises for construction of privies, installation of septic tanks, and repair of wells.

Accessory to the protection of general water supplies are such related activities as regulation of the sale of bottled waters, control of water used as ice supplies, and certification of drinking water used by interstate carriers. Health department jurisdiction of more than three-fourths of the States extends to all or part of these functions.

The acme of complexity in sanitation activities occurs in that portion of the program which involves food and drug control (including milk and shellfish sanitation) and restaurant supervision. Confusion is due to disagreement regarding what should be covered, who should be responsible, and how the desired results should be attained. As a result, the division of authority and variation in procedures are so heterogeneous that they almost defy classification and description in accordance with any pattern that could be devised. Functional overlapping and interweaving apply principally to the health departments and the departments of agriculture. To a lesser degree, they involve many other State agencies among which the dairy and food commissions, hotel and restaurant commissions, livestock sanitary boards, departments of labor, departments of conservation, boards of pharmacy, State universities and colleges, and independent State laboratories are outstanding. Control methods of agencies other than the health department are usually limited to inspections, laboratory analysis of suspected products, and law enforcement. In addition to these approaches, the health department stresses educational measures.

Besides the sanitation of water and food supplies in their many ramifications, State programs of sanitation have gradually been extended to include a number of miscellaneous environmental sanitation activities. Among these are found swimming pool sanitation, malaria and pest mosquito control, housing and plumbing control, garbage collection and disposal, rodent control, and prevention of smoke, fumes, and odors. The extent of State authority over this miscellaneous group varies. In many instances the State agency functions only in an advisory capacity.

Over-all State programs of sanitation are costing the Nation in excess of 16¾ million dollars annually, or an average of $0.125 per capita. Of this amount, 25 percent represents health department expenditure, while 37 percent is expended by the department of agriculture. Health department expenditures alone have more than doubled during the past 10 years.

DEATHS DURING WEEK ENDED JUNE 6, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended June 6, 1942	Corresponding week, 1941
Data from 88 large cities of the United States:		
Total deaths	8,155	8,046
Average for 3 prior years	8,069	
Total deaths, first 22 weeks of year	194,328	197,506
Deaths per 1,000 population, first 22 weeks of year, annual rate	12.3	12.5
Deaths under 1 year of age	552	486
Average for 3 prior years	481	
Deaths under 1 year of age, first 22 weeks of year	12,423	11,513
Data from industrial insurance companies:		
Policies in force	64,976,525	64,469,440
Number of death claims	10,602	11,772
Death claims per 1,000 policies in force, annual rate	8.5	9.5
Death claims per 1,000 policies, first 22 weeks of year, annual rate	9.9	10.3

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JUNE 13, 1942

Summary

The number of reported cases of meningococcus meningitis increased from 68 to 75 during the current week. More than one-half of the cases (41) were reported in the Middle and South Atlantic areas, where the disease is largely confined to a few States. For the current week the largest numbers of cases were reported from New York (19) and Maryland (12). A total of 1,791 cases has been reported to date this year, a larger number than that reported for the corresponding period of any other year since 1937, when 3,516 cases had been reported for this period.

The incidence of influenza remains low, though slightly above the 5-year (1937–41) median. The number of cases of poliomyelitis increased from 17 to 23, but both the current figure and the cumulative cases to date are below the 5-year medians as well as below the figures for the corresponding periods of all other years since 1938.

A total of 7 scattered cases of smallpox was reported. Only 514 cases have been reported to date this year, which is only one-half the number reported for the same period last year, when the lowest incidence on record was recorded for the United States.

Other reports include 2 cases of anthrax (1 in New Jersey and 1 in Pennsylvania), 4 cases of leprosy (2 in California and 1 each in New York and Illinois), 28 cases of amebic, 212 bacillary (139 in Texas), and 134 unspecified dysentery, 26 cases of Rocky Mountain spotted fever (16 in the northwestern States), 18 cases of tularemia, and 42 cases of endemic typhus fever (14 in Georgia, 10 in Alabama).

Dysentery has been reported above the median expectancy in Texas each week during the current year, and both dysentery and malaria have recently shown a significant increase in that State.

The death rate for the current week for 88 large cities in the United States is 11.3 per 1,000 population, as compared with 11.4 for the preceding week and a 3-year (1939–41) average of 10.9. The cumulative rate to date (first 23 weeks) is 12.3 as compared with 12.4 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended June 13, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	June 13, 1942	June 14, 1941		June 13, 1942	June 14, 1941		June 13, 1942	June 14, 1941		June 13, 1942	June 14, 1941	
NEW ENG.												
Maine	0	0	0	------	4	2	113	155	147	4	0	0
New Hampshire	0	0	0	------	------	------	5	20	20	1	0	0
Vermont	0	1	0	------	------	------	163	74	74	0	0	0
Massachusetts	7	3	3	------	------	------	856	1,038	1,038	2	5	2
Rhode Island	0	1	0	------	------	------	170	1	69	0	0	0
Connecticut	0	0	1	2	1	3	324	631	130	0	0	0
MID. ATL.												
New York	8	13	22	[1] 3	[1] 2	[1] 4	1,268	2,205	1,856	19	4	4
New Jersey	5	6	6	------	4	3	568	1,343	1,123	2	0	1
Pennsylvania	14	11	25	------	------	------	715	3,477	1,727	5	3	6
E. NO. CEN.												
Ohio	2	3	9	3	3	7	361	1,371	997	1	3	3
Indiana	2	13	6	3	8	8	73	328	279	1	0	1
Illinois	19	11	26	44	5	10	222	761	457	1	2	2
Michigan [2]	1	3	7	4	2	1	461	1,242	793	1	1	1
Wisconsin	0	1	1	21	27	19	1,207	1,690	1,111	1	0	0
W. NO. CEN.												
Minnesota	1	3	3	------	2	2	309	17	86	0	0	0
Iowa	3	2	2	------	3	------	235	257	167	0	0	0
Missouri	0	2	7	3	1	1	496	324	56	3	0	0
North Dakota	1	0	1	2	------	7	19	21	17	0	0	0
South Dakota	1	0	0	------	------	------	7	2	2	0	0	0
Nebraska	0	1	1	2	------	------	89	20	20	0	0	0
Kansas	4	5	1	3	4	3	177	203	203	1	0	1
SO. ATL.												
Delaware	0	1	1	------	------	------	7	29	20	0	0	0
Maryland [2]	4	3	3	------	3	2	178	473	195	12	2	0
Dist. of Col.	1	2	2	------	------	------	42	184	93	1	0	0
Virginia	2	6	6	86	85	34	83	798	339	0	1	1
West Virginia	2	2	3	------	7	7	25	453	39	0	4	3
North Carolina	5	3	6	5	------	------	262	852	296	2	0	0
South Carolina	0	12	3	89	105	95	60	514	63	0	0	1
Georgia	3	4	4	6	4	4	33	207	43	0	0	0
Florida	5	1	2	2	11	2	71	84	69	0	1	1
E. SO. CEN.												
Kentucky	4	3	6	3	1	2	33	420	144	3	1	1
Tennessee	3	0	3	16	24	18	77	242	94	2	0	0
Alabama	1	8	8	18	14	14	26	149	80	2	1	2
Mississippi [2]	2	3	3	------	------	------	------	------	------	0	1	1
W. SO. CEN.												
Arkansas	4	6	3	12	4	9	68	125	28	0	0	0
Louisiana	6	0	10	2	4	9	70	18	7	2	2	1
Oklahoma	2	3	5	23	15	16	38	116	116	0	0	1
Texas	11	13	16	145	237	143	225	489	437	2	2	2
MOUNTAIN												
Montana	1	2	2	------	------	------	148	26	50	0	0	0
Idaho	0	0	0	------	------	------	54	4	23	0	0	0
Wyoming	0	3	1	13	1	------	15	8	21	0	0	0
Colorado	9	8	8	22	21	------	166	162	143	0	0	0
New Mexico	5	3	1	2	------	------	12	79	67	0	0	0
Arizona	0	1	2	23	52	43	64	96	53	0	0	0
Utah [2]	0	3	0	------	14	------	634	23	105	0	0	0
Nevada	0	0	------	------	1	------	25	101	------	0	0	------

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended June 13, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41
	June 13, 1942	June 14, 1941		June 13, 1942	June 14, 1941		June 13, 1942	June 14, 1941		June 13, 1942	June 14, 1941	
PACIFIC												
Washington	3	2	2	1			992	14	93	1	0	0
Oregon	0	0	1	9	8	10	49	52	52	2	0	0
California	13	11	25	49	126	23	3,367	555	555	4	3	3
Total	154	182	289	616	798	512	14,662	21,453	11,669	75	36	36
23 weeks	5,897	5,897	9,556	76,675	482,457	156,231	423,156	765,295	312,854	1,791	1,099	1,099

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41
	June 13, 1942	June 14, 1941		June 13, 1942	June 14, 1941		June 13, 1942	June 14, 1941		June 13, 1942	June 14, 1941	
NEW ENG.												
Maine	1	0	0	8	4	13	0	0	0	0	1	1
New Hampshire	0	0	0	9	3	1	0	0	0	0	0	0
Vermont	0	0	0	5	3	2	0	0	0	0	0	0
Massachusetts	0	0	0	197	157	157	0	0	0	4	1	1
Rhode Island	0	0	0	2	6	6	0	0	0	1	0	0
Connecticut	1	0	0	18	45	48	0	0	0	0	0	1
MID. ATL.												
New York	2	2	1	239	348	389	0	0	0	5	15	9
New Jersey	0	1	1	83	139	102	0	0	0	2	6	2
Pennsylvania	0	3	1	210	186	223	0	0	0	10	16	8
E. NO. CEN.												
Ohio	0	0	0	196	170	170	1	2	2	3	7	7
Indiana	0	0	0	20	43	43	0	0	10	0	4	3
Illinois	3	3	1	75	154	291	1	2	15	2	5	5
Michigan [3]	0	2	0	178	191	276	0	1	1	4	2	2
Wisconsin	0	0	0	93	82	94	0	1	1	2	0	0
W. NO. CEN.												
Minnesota	1	0	0	24	48	44	0	1	3	0	3	0
Iowa	1	0	0	14	26	45	0	10	14	1	0	1
Missouri	0	0	0	132	40	46	0	1	8	1	2	7
North Dakota	0	0	0	6	3	5	0	0	7	0	0	0
South Dakota	1	0	0	8	3	3	0	3	8	0	0	0
Nebraska	0	0	0	6	14	14	0	0	1	0	2	2
Kansas	0	0	0	17	14	29	0	0	5	1	1	1
SO. ATL.												
Delaware	0	0	0	7	10	6	0	0	0	0	0	0
Maryland [3]	0	0	0	39	32	21	0	0	0	3	5	3
Dist. of Col.	0	0	0	6	5	6	0	0	0	1	0	0
Virginia	1	0	0	17	9	10	0	0	0	3	3	3
West Virginia	0	0	0	9	9	23	0	0	0	3	2	3
North Carolina	0	1	0	17	9	16	0	0	0	10	7	7
South Carolina	1	1	1	1	2	0	0	0	0	1	6	6
Georgia	0	0	0	4	9	6	0	0	0	13	5	12
Florida	1	3	1	1	1	3	0	0	0	4	8	5

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended June 13, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	June 13, 1942	June 14, 1941		June 13, 1942	June 14, 1941		June 13, 1942	June 14, 1941		June 13, 1942	June 14, 1941	
E. SO. CEN.												
Kentucky	0	0	0	35	34	20	0	0	1	2	5	9
Tennessee	1	1	1	24	29	26	0	1	0	6	1	3
Alabama	1	0	1	4	10	6	0	0	1	1	0	4
Mississippi [2]	1	2	2	8	0	2	1	0	0	2	5	5
W. SO. CEN.												
Arkansas	1	0	0	5	2	4	2	0	0	1	5	7
Louisiana	3	1	1	4	5	6	0	0	0	4	16	11
Oklahoma	0	0	0	4	9	9	0	2	2	4	1	9
Texas	1	2	3	12	18	22	1	0	2	17	11	18
MOUNTAIN												
Montana	0	0	0	4	9	9	0	0	2	0	0	0
Idaho	0	0	0	2	5	5	0	0	1	0	0	0
Wyoming	0	0	0	5	1	3	0	0	0	0	0	0
Colorado	0	0	0	11	22	22	0	0	1	1	2	2
New Mexico	0	0	0	2	3	7	0	0	0	1	3	3
Arizona	0	0	0	0	3	3	0	0	0	0	2	2
Utah [2]	0	0	0	2	3	9	0	0	0	0	0	0
Nevada	0	0	-----	0	0	-----	0	0	-----	0	0	-----
PACIFIC												
Washington	0	0	0	16	20	25	0	1	1	0	1	3
Oregon	2	0	0	5	9	14	1	0	4	0	3	1
California	0	6	4	85	84	123	0	0	8	3	5	9
Total	23	28	38	1,859	2,031	2,325	7	25	148	116	161	209
23 weeks	476	523	523	80,809	80,877	106,053	514	1,025	6,898	1,939	2,082	2,815

Division and State	Whooping cough		Week ended June 13, 1942								
	Week ended—		Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	June 13, 1942	June 14, 1941		Amebic	Bacillary	Unspecified					
NEW ENG.											
Maine	65	20	0	0	0	0	0	0	0	0	0
New Hampshire	2	11	0	0	0	0	0	0	0	0	0
Vermont	50	10	0	0	0	0	0	0	0	0	0
Massachusetts	187	267	0	0	0	0	4	0	0	0	0
Rhode Island	32	33	0	0	0	0	0	0	0	0	0
Connecticut	86	81	0	0	1	0	0	0	0	0	0
MID. ATL.											
New York	368	293	0	1	4	0	1	1	0	0	1
New Jersey	432	110	1	0	0	0	0	0	1	0	0
Pennsylvania	215	294	1	0	0	0	0	0	0	0	0
E. NO. CEN.											
Ohio	196	305	0	0	0	0	1	0	0	1	0
Indiana	34	34	0	0	0	0	0	0	0	0	0
Illinois	275	82	0	2	0	0	0	1	1	1	0
Michigan [2]	218	240	0	0	0	0	0	0	0	0	0
Wisconsin	206	144	0	0	0	0	0	0	0	0	0

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended June 13, 1942—Continued

Division and State	Whooping cough		Week ended June 13, 1942								
	Week ended—		Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	June 13, 1942	June 14, 1941		Amebic	Bacillary	Unspecified					
W. NO. CEN.											
Minnesota	20	94	0	1	0	0	0	0	0	0	0
Iowa	29	33	0	0	0	0	0	0	0	0	0
Missouri	20	10	0	0	0	0	0	0	0	0	0
North Dakota	8	17	0	0	0	0	2	0	0	0	0
South Dakota	4	3	0	0	0	0	0	0	0	0	0
Nebraska	16	10	0	0	0	0	0	0	0	0	0
Kansas	55	142	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	1	1	0	0	0	0	0	0	0	0	0
Maryland [2]	34	76	0	0	0	0	0	0	1	0	0
Dist. of Col	24	16	0	0	0	0	0	0	0	0	0
Virginia	41	67	0	0	0	91	0	0	4	1	0
West Virginia	17	49	0	0	0	0	0	0	0	0	0
North Carolina	160	251	0	0	0	0	0	0	2	0	0
South Carolina	50	131	0	0	0	0	0	0	0	0	2
Georgia	14	18	0	4	14	0	0	0	0	3	14
Florida	10	32	0	0	1	0	0	0	0	1	9
E. SO. CEN.											
Kentucky	80	33	0	0	0	0	1	0	0	0	0
Tennessee	67	86	0	0	0	12	0	0	0	1	0
Alabama	71	51	0	0	0	0	0	0	0	0	10
Mississippi [2]	-------	--- --	0	0	0	0	0	0	0	0	0
W. SO. CEN.											
Arkansas	42	33	0	2	48	0	0	0	0	5	0
Louisiana	12	3	0	0	0	0	0	0	0	0	1
Oklahoma	9	25	0	0	0	18	0	0	1	0	0
Texas	138	401	0	14	139	0	1	0	0	0	4
MOUNTAIN											
Montana	18	13	0	0	0	0	0	0	1	2	0
Idaho	1	21	0	0	0	0	0	0	1	0	0
Wyoming	7	13	0	0	0	0	0	0	6	2	0
Colorado	29	173	0	0	0	0	1	0	0	0	0
New Mexico	20	13	0	0	0	0	0	0	0	0	0
Arizona	10	52	0	0	0	31	0	0	0	0	0
Utah [2]	42	97	0	0	0	0	0	0	3	1	0
Nevada	6	0	0	0	0	0	0	0	1	0	0
PACIFIC											
Washington	67	127	0	0	0	0	0	0	2	0	0
Oregon	16	17	0	0	0	0	0	0	2	0	0
California	274	735	0	4	5	0	2	2	0	0	1
Total	3,778	4,767	2	28	212	152	13	4	26	18	42
23 weeks	88,081	107,829	-------	-------	-------	-------	-------	-------	-------	-------	-------

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended May 30, 1942

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0		0	1	0	3	0	4	0	0	6
Baltimore, Md	2	0		0	149	6	6	0	24	0	2	31
Barre, Vt	0	0		0	0	0	0	0	0	0	0	2
Billings, Mont	1	0		0	23	0	0	0	0	0	0	2
Birmingham, Ala	0	0	2	0	2	0	1	0	0	0	0	5
Boise, Idaho	0	0		0	4	0	0	0	1	0	0	0
Boston, Mass	1	0		0	201	0	13	0	55	0	0	29
Bridgeport, Conn	0	0		2	13	0	1	0	2	0	0	1
Brunswick, Ga	0	0		0	20	0	0	0	0	0	0	0
Buffalo, N Y	0	0		0	22	0	5	0	18	0	0	5
Camden, N J	1	0		0	1	0	3	0	5	0	1	2
Charleston, S C	0	0	6	0	28	0	0	0	0	0	0	3
Charleston, W Va	0	0		0	0	0	0	0	1	0	0	0
Chicago, Ill	19	0	2	2	40	0	15	1	62	0	0	137
Cincinnati, Ohio	0	0	2	1	10	0	1	0	22	0	0	9
Cleveland, Ohio	0	1	3	0	5	0	3	0	43	0	0	19
Columbus, Ohio	0	0		0	39	0	2	0	4	0	0	13
Concord, N H	0	0		0	0	0	1	0	0	0	0	0
Cumberland, Md	0	0		0	0	0	0	0	0	0	0	0
Dallas, Tex	2	0		0	13	0	1	0	2	0	1	0
Denver, Colo	2	0	11	0	139	0	6	0	2	1	1	9
Detroit, Mich	1	0		0	34	0	7	0	122	0	0	84
Duluth, Minn	0	0		0	5	1	1	0	6	0	0	0
Fall River, Mass	4	0		0	23	0	0	0	16	0	0	2
Fargo, N Dak	0	0		0	4	0	0	0	1	0	0	0
Flint, Mich	0	0		0	1	0	0	0	2	0	1	7
Fort Wayne, Ind	0	0		0	0	0	2	0	0	0	1	0
Frederick, Md	0	0		0	0	0	0	0	1	0	0	0
Galveston Tex	0	0		0	7	0	2	0	0	0	0	4
Grand Rapids, Mich	0	0		0	0	0	0	0	2	0	0	9
Great Falls, Mont	0	0		0	25	0	0	0	2	0	0	3
Hartford, Conn	0	0		0	52	1	3	0	3	0	0	15
Helena, Mont	0	0		0	27	0	0	0	5	0	0	2
Houston, Tex	1	0		0	14	0	14	0	5	0	4	4
Indianapolis, Ind	1	0		0	74	0	5	0	12	0	0	22
Kansas City, Mo	5	0		0	97	2	5	0	19	0	0	1
Kenosha, Wis	0	0		0	5	0	0	0	2	0	0	16
Little Rock, Ark	0	0	3	0	1	0	0	0	1	0	0	0
Los Angeles, Calif	1	0	12	2	401	2	15	0	17	0	3	16
Lynchburg, Va	1	0		0	2	0	1	0	0	0	0	24
Memphis, Tenn	0	0	3	0	20	0	4	0	1	0	0	9
Milwaukee, Wis	0	0		0	365	0	4	0	28	0	0	48
Minneapolis, Minn												
Missoula, Mont	0	0		0	3	2	0	0	1	0	0	0
Mobile, Ala	0	0		1	0	0	0	0	0	0	0	0
Nashville, Tenn	0	0		0	4	0	2	0	0	0	0	1
Newark, N J	0	0	1	1	[illegible]	1	4	0	17	0	0	60
New Haven, Conn	0	0		0	53	0	1	0	0	0	0	2
New Orleans, La	0	0	3	1	40	0	6	1	2	0	0	1
New York, N Y	13	3	6	2	148	7	30	2	159	0	3	167
Omaha, Nebr	0	0		0	58	0	1	0	2	0	0	0
Philadelphia, Pa	0	0	1	0	35	4	12	0	134	0	3	116
Pittsburgh, Pa	2	0		1	7	1	6	0	12	0	0	15
Portland, Maine	0	0	----	0	10	0	2	0	0	0	0	2
Providence, R I	0	0	-----	0	126	0	4	0	2	0	0	21

See footnotes at end of table.

City reports for week ended May 30, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Pueblo, Colo	0	0	------	0	1	0	0	0	2	0	0	0
Racine, Wis	0	0	------	0	254	0	0	0	9	0	0	24
Raleigh, N. C	------	------	------	------	------	------	------	------	------	------	------	------
Reading, Pa	0	0	------	0	2	0	1	0	2	0	0	11
Richmond, Va	1	0	------	0	14	0	8	1	1	0	0	1
Roanoke, Va	0	0	------	0	3	0	0	0	0	0	0	0
Rochester, N. Y	0	0	------	0	10	0	0	0	7	0	0	11
Sacramento, Calif	2	0	------	0	43	0	0	0	4	0	0	26
Saint Joseph, Mo	0	0	------	0	1	0	0	0	1	0	0	0
Saint Louis, Mo	1	0	1	1	45	0	10	0	8	0	1	4
St. Paul, Minn	0	0	------	0	56	0	1	0	1	0	0	10
Salt Lake City, Utah	0	0	------	0	303	0	5	0	5	0	0	8
San Antonio, Tex	0	0	2	1	7	0	6	0	0	0	0	4
San Francisco, Calif	1	0	3	0	617	1	7	1	6	0	0	24
Savannah, Ga	0	0	1	0	1	1	0	0	1	0	0	12
Seattle, Wash	1	0	------	0	269	0	4	0	4	0	0	15
Shreveport, La	0	0	------	0	3	0	2	0	1	0	0	0
South Bend, Ind	------	------	------	------	------	------	------	------	------	------	------	------
Spokane, Wash	0	0	------	0	50	0	2	0	1	0	0	1
Springfield, Ill	0	0	------	0	13	0	7	0	4	0	0	1
Springfield, Mass	0	0	------	0	58	1	3	0	9	0	0	10
Superior, Wis	0	0	------	7	3	0	0	0	0	0	0	2
Syracuse, N. Y	0	0	------	0	542	0	1	0	3	0	0	27
Tacoma, Wash	0	0	------	0	28	0	1	0	0	0	0	4
Tampa, Fla	0	0	------	0	25	0	3	0	0	0	0	2
Terre Haute, Ind	1	0	------	0	2	0	1	0	1	0	0	0
Topeka, Kans	0	0	------	0	23	0	1	0	1	0	0	0
Trenton, N. J	0	0	1	1	0	0	1	0	5	0	0	2
Washington, D. C	0	0	------	0	50	0	9	0	5	0	0	17
Wheeling, W. Va	0	0	------	0	1	1	2	0	3	1	0	0
Wichita, Kans	0	0	------	0	61	0	0	0	1	0	0	6
Wilmington, Del	0	1	------	0	10	0	0	0	1	0	0	0
Wilmington, N. C	0	0	------	0	3	0	3	0	0	0	0	9
Winston-Salem, N. C	0	0	------	0	9	0	2	0	1	0	1	0
Worcester, Mass	0	0	------	0	6	0	7	0	8	0	0	47

Anthrax.—Cases: Philadelphia, 1.
Dysentery, amebic.—Cases: Birmingham, 1; New York, 1.
Dysentery, bacillary.—Cases: Dallas, 1; Los Angeles, 1; Richmond, 1; Syracuse, 1.
Typhus fever.—Cases: Philadelphia, 1.

Rates (annual basis) per 100,000 population, for the group of 87 cities in the preceding table (estimated population, 1942, 33,485,219)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended May 30, 1942	9.97	9.81	3.58	812.85	42.67	142.33	0.31	3.43	187.17
Average for week, 1937-41	14.16	8.65	3.30	[1]655.71	59.90	237.61	1.89	4.09	190.09

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended May 16, 1942.—During the week ended May 16, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			1	6	12			2	1	22
Chickenpox		5		130	264	35	34	31	94	593
Diphtheria		11	2	21		8	4	1	1	48
Dysentery				9						9
Encephalomyelitis							2			2
German measles		1		5	62	9	17	6	23	123
Influenza					3		12		24	39
Measles		2	1	441	165	138	9	14	12	782
Mumps		24	1	209	400	57	156	46	445	1,338
Pneumonia		2			13	3	3		32	53
Scarlet fever	2	32	12	64	208	35	20	97	37	507
Tuberculosis	3	1	19	69	60	56	27	2	108	345
Typhoid and paratyphoid fever			1	9	2		2			14
Undulant fever					3		1		1	5
Whooping cough		4	1	163	77	1		11	62	319
Other communicable diseases		1		7	223	56		1	26	314

NEW ZEALAND

Notifiable diseases—4 weeks ended February 23, 1942.—During the 4 weeks ended February 23, 1942, certain notifiable diseases were reported in New Zealand as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Actinomycosis	1		Puerperal fever	7	1
Cerebrospinal meningitis	27	3	Scarlet fever	27	
Diphtheria	61		Tetanus	1	
Dysentery (bacillary)	11	1	Trachoma	1	
Erysipelas	17	1	Tuberculosis	160	44
Food poisoning	34	1	Typhoid fever	4	1
Poliomyelitis	1		Undulant fever	1	

SWITZERLAND

Notifiable diseases—Year 1941.—During the year 1941, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	Cases	Disease	Cases
Anthrax	1	Mumps	973
Cerebrospinal meningitis	250	Paratyphoid fever	87
Chickenpox	2,008	Poliomyelitis	1,479
Diphtheria	1,115	Scarlet fever	3,311
Dysentery	5	Trachoma	5
German measles	1,374	Tuberculosis	3,477
Influenza	545	Typhoid fever	70
Lethargic encephalitis	8	Typhus fever	2
Malaria	3	Undulant fever	129
Measles	3,629	Whooping cough	1,786

TURKEY

Notifiable diseases—Year 1941.—During the year 1941, certain notifiable diseases were reported in Turkey as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	723	49	Paratyphoid fever	198	13
Cerebrospinal meningitis	476	164	Puerperal fever	94	28
Chickenpox	8		Scarlet fever	610	7
Diphtheria	936	144	Smallpox	7	2
Dysentery (amebic)	422	48	Tetanus	43	17
Dysentery (bacillary)	175	46	Trachoma	1	
Encephalitis, epidemic	1	1	Typhoid fever	3,139	294
Erysipelas	18	5	Typhus fever	950	108
Leprosy	74	1	Undulant fever	8	
Measles	5,030	245	Whooping cough	12	1

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-named diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Morocco.—During the week ended May 23, 1942, 35 cases of plague were reported in Morocco.

Typhus Fever

Algeria.—During the period May 1–10, 1942, 1,641 cases (167 in Algiers; 17 in Bone; 61 in Oran) of typhus fever were reported in Algeria.

Bulgaria.—During the week ended May 9, 1942, 43 cases of typhus fever were reported in Bulgaria.

Morocco.—During the week ended May 23, 1942, 1,050 cases of typhus fever were reported in Morocco.

Spain.—During the week ended May 9, 1942, 70 cases (7 in Madrid; 13 in Barcelona) of typhus fever were reported in Spain. During the week ended May 2, 1942, 46 cases were reported.

Tunisia.—During the week ended May 9, 1942, 485 cases of typhus fever were reported in Tunisia.

COURT DECISION ON PUBLIC HEALTH

Manufacturer of bakery products held not liable in action based on illness resulting therefrom.—(Massachusetts Supreme Judicial Court; *Johnson* v. *Stoddard et al.* (2 cases), 37 N.E.2d 505; decided October 31, 1941.) A wife and husband each sued two individuals, as manufacturers of bakery products, to recover damages for illness resulting from eating cream puffs which were alleged to have been unfit for human consumption because infected with dangerous germs from one of the defendants' employees. In each case the judge directed a verdict in favor of one of the defendants while the jury returned a verdict against the other defendant. The judge reported the cases to the supreme court of Massachusetts upon the stipulation that, if they were properly submitted to the jury, judgments were to be entered in accordance with the verdicts; otherwise, judgment in each case was to be entered for the defendant against whom the verdicts had been returned.

There was evidence that the wife purchased four cream puffs for herself and her husband at a store which procured bakery products, including cream puffs, from the defendant. The plaintiffs ate these puffs on the day purchased, April 1, 1937, there being nothing wrong in their appearance and taste. One of the plaintiffs became ill on April 8 and the other on April 10. The appellate court said that it could be found that they were suffering from paratyphoid B.

On April 29 the defendant was informed by a physician who was apparently connected with the State department of health that he was suspicious that an employee of the defendant had this disease and the defendant immediately laid off the employee. This employee had worked 5 years for the defendant and during that time was never sick. In 1936 he had been immunized against the disease. There was other evidence by physicians who were also health officials, and the supreme court said that the question before it was whether the evidence was sufficient to warrant the verdicts for the plaintiffs.

According to the court the manufacturer of an article of food for human consumption owed a duty to the ultimate consumer to exercise care in its preparation and output in order that his product would not cause injury to the consumer, and the degree of care that had to be exercised was commensurate with the danger to the life and health of the consumer that might probably result from the lack of such care. The court assumed, without deciding, that the evidence would warrant an inference that the employee was a carrier of paratyphoid B when the puffs were manufactured and that in some way germs from him were imparted to the puffs, but it went on to say that there was no evidence that the defendant knew or reasonably could be expected to know that one of his employees was in such

physical condition that it was dangerous to permit him to handle food. "Indeed, the testimony is to the contrary and clearly demonstrates that it was not until April 29, 1937, that the defendant had or should have had any knowledge concerning this condition of the employee."

In the next place it was the court's view that the evidence would not support a contention that the employee on April 1 knew or ought to have known that he was afflicted with a dangerous disease which might be transmitted to others through the food that he handled and that there was nothing upon which liability could be imposed upon the defendant on the ground that the employee was negligent.

In an attempt to prove negligence of the defendant the plaintiffs relied upon a violation of a State statute which provided, in part, that there should not be used in bakery products or in the ingredients thereof any ingredient or material, including water, which was spoiled or contaminated or which might render the product unwholesome, unfit for food or injurious to health, and that there should not be used in any bakery product any ingredient likely to deceive the consumer or which lessened the nutritive value of such product. The law also provided that the said ingredients and the sale and offering for sale of the said products should otherwise comply with certain specified sections of the statutes. The court said that the purpose of the statute was to require the manufacturer to use only pure and wholesome materials and such as would not be injurious to health and that there was no contention that the use of any of the materials that went into the cream puffs was contrary to the statute. "The primary concern of the statute is to insure the wholesomeness of the finished product by the use of proper ingredients. It deals specifically with the ingredients as distinguished from the manufactured product." Regarding the plaintiffs' contention that some of the ingredients were impregnated by disease germs emanating from the employee, the court stated that the plaintiffs had not sustained the burden upon them of showing that the ingredients used did not comply with the statute.

The judgment in each case was in favor of the defendant.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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Public Health Reports

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Public Health Reports

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A CHRONIC DEFICIENCY OF (1) CALCIUM, (2) VITAMIN C, AND (3) BOTH CALCIUM AND VITAMIN C IN MONKEYS

By H. F. FRASER, *Passed Assistant Surgeon, United States Public Health Service*[1]

The pathologic condition induced by excluding as completely as possible certain dietary essentials from animals is frequently very striking. It should be recognized, however, that such experiments represent artificial conditions to which the animal or man is rarely, if ever, exposed under natural conditions. It was decided, therefore, in the experiments herein reported, to observe the effect in monkeys of a chronic or partial deficiency of (1) calcium, (2) vitamin C, and (3) both calcium and vitamin C. The mouth lesions in these animals are separately reported by Fraser and Topping, and the histopathology by Tomlinson. These subjects are made the basis of two concurrent reports.

Selection and grouping of animals.—Thirty monkeys were placed in individual screen-bottom cages and preliminary observations made for symptoms of disease. This included a record of the temperature daily except Sunday for 5 weeks, one stool culture, a weekly weight record, and two complete blood counts on each animal. Following such initial observations, 24 monkeys in good condition were selected and divided into groups, being equalized as evenly as possible, taking into account age as estimated from the teeth (*1*), sex, and weight.

Four monkeys received control diet 516 composed of natural foods; 8 animals received control diet 517 composed of processed foods with calcium in the salt mixture and appropriately supplemented with vitamin C; 4 animals received diet 518 which was deficient in calcium; 4 animals were given diet 519 containing inadequate supplements of vitamin C; and 4 animals were placed on a regime of chronic deficiency respecting both calcium and vitamin C as provided by diet 520.

One monkey receiving control diet 517 consistently refused his food and was discontinued after 22 days. Another monkey on the calcium and vitamin C deficient diet developed acute pulmonary tuberculosis and was killed after 21 days. Each of these was replaced by a monkey from the stock colony in good condition. Except for these two animals, no substitutions or additions were made to the experimental group.

Diets served monkeys.—The composition of the above diets and their method of preparation are presented in table 1.

Salt mixture A is a modification of Hubbel, Mendel, and Wakeman (*3*). One kg. of this salt mixture contains the following ingredients with a ratio as specified: calcium carbonate 474, manganous sulfate, anhydrous, 0 76, potassium iodide 0.17, sodium fluoride 0.22, cupric sulfate 1.95, magnesium carbonate 54, magnesium sulfate 34.9, sodium chloride 149, potassium chloride 242, and ferric citrate 43.

[1] From the Division of Chemotherapy, National Institute of Health.

Table 1.—*Composition and preparation of diets*

Nutrients	Diet number				
	516[1] Control	517 Control (gm)	518 Ca deficient (gm.)	519 Vitamin C deficient (gm.)	520 Ca and vitamin C deficient (gm)
Graham flour[2]	Composed of the following natural foods Whole milk, Irish potatoes, lettuce, eggs, whole-wheat bread, bananas, carrots, and cabbage.	15	15	15	15
Corn meal[2]		50	50	50	50
Sucrose		8 95	8 95	8 95	8 95
Cottonseed oil[2]		5	5	5	5
Butterfat, dehydrated		1	1	1	1
Liver, dried[3]		7	7	7	7
Casein, leached		10	10	10	10
Liver extract 343 Lilly		0 1	0 1	0.1	0 1
Cod liver oil		2	2	2	2
Salt mixture A, with $CaCO_3$[2]		0 95	--	0 95	------
Salt mixture B, without $CaCO_3$[2]		--	0 5	------	0 5
Average supplement vitamin C daily	*mg* None	*mg* 30	*mg* 30	*mg* 1 96 mg or less	

[1] The composition and schedule for monkey diet 516 is the same as that of 495A used in other experiments previously reported (2), except that 2 additional eggs were given each monkey each week and 300 ml instead of 250 ml of milk were provided daily.
[2] These items are stirred into water in a double boiler of enamelware and cooked for 1½ hours Then the other ingredients are well stirred in, the completed diet is dried for 3 hours and fed ad libitum
[3] The pork liver was cooked in a double boiler for 30 minutes and then air- and oven-dried For a period of 31 days, from Dec. 15, 1939, to Jan. 15, 1940, the liver received the additional treatment of autoclaving for 1½ hours.

Salt mixture B is identical with salt mixture A except that the calcium carbonate has been omitted.

Diets 517 and 518 were supplemented with 30 mg. of vitamin C given 5 days a week and 60 mg. 1 day a week. Animals which received diets 519 and 520 received daily or intermittent allowances of small amounts of vitamin C as shown in table 2. All supplements of vitamin C were given by intramuscular injection.

Table 2.—*Vitamin C schedule of each monkey with chronic vitamin C deficiency or chronic vitamin C plus chronic calcium deficiency*

May 17 to Aug. 7, 1939	Aug 7 to Dec 13, 1939[1]	Dec 13 to Jan. 11, 1940	Jan. 12, 1940	Jan 26 to Apr 19, 1940, each animal received 3 or 6 mg dose for symptoms		Total vitamin C each monkey	
				Monkey No.	Total mg. of 3 or 6 mg doses	Days on experiment	Total C in mg.
Each monkey received 3 mg. of vitamin C for 5 days and 6 mg. for 1 day each week, a total of 243 mg. for this period.	Each monkey received 3 mg 3 times a week, a total of 165 mg. for this period.	No monkey received any vitamin C.	Four animals 473, 400, 475, and 477 each received 30 mg.	[2]461	63	340	471
				[2]473	51	336	489
				[2]459	33	335	441
				[2]400	39	337	477
				[3]471	48	335	456
				[3]479	45	334	483
				[3]475	33	333	473
				[3]477	48	341	486

[1] Monkey 479 was given 30 mg. of vitamin C on Nov. 18, 1939, by mistake as the animal showed no symptoms of deficiency.
[2] Vitamin C deficient.
[3] Vitamin C plus calcium deficient.

Calcium deficient diets 518 and 520, by chemical analysis prior to cooking, contained 10.2 mg. of calcium per 100 gm. of ration and the calcium control diet 517 contained 190 mg. of calcium per 100 gm. of ration. The amount of each basal ingredient, except for the salt mixture, is identical for diets 517, 518, 519, and 520. The basal constituents of each of these diets contain 380 mg. of phosphorus per 100 gm. No phosphorus was added to either salt mixture, hence the amount of phosphorus in each of these diets is comparable.

Concurrent check assays of monkey diets in rats and guinea pigs.—Three separate groups of rats composed of 40, 20, and 10 animals, ranging in age from 21 to 25 days and including males and females, were used to test diets 517 and 518 as served to monkeys. They were observed for rate of growth, symptoms, ability to reproduce, and success in lactation. Rats on control diet 517 grew well and were successful in reproduction and lactation. Rats on calcium deficient diet 518 showed symptoms of loss of weight, depilation, irritability, muscular weakness, and paralysis of hind legs. Many of these animals died by the tenth week of the experiment.

Twenty-four guinea pigs were used to test for the presence of vitamin C in the dried liver by comparing it with dried liver from the same lot which was autoclaved for 1½ hours. There was no vitamin C in the liver by biological tests and none was found by titrating the extracted liver with 2–6 dichlorophenol-indophenol.

Since the monkeys received autoclaved liver for 31 days, 20 additional rats were used to test the effect of this change in the basal diet. There was no difference noted in rats by such a change in the liver preparation. (There was also no evidence that the substitution of autoclaved liver affected the monkeys.)

Clinical course of animals.—In planning the experiment it was considered desirable to maintain the animals in a chronic phase of depletion and then observe their response to therapy of minimum doses. The four calcium deficient monkeys on diet 518 showed no conspicuous clinical symptoms for 11 months. Consequently no calcium therapy was given to any animal. Of the 8 animals on a low calcium intake, either alone or associated with vitamin C deficiency, 6 were sacrificed after 11 months on the diet and 2 calcium deficient animals were continued for 7 additional months on the same diet.

Except for 1 animal, the 8 animals which received the low allowance of vitamin C either alone or in combination with a low calcium intake showed no conspicuous symptoms of vitamin C depletion from May 17, 1939, to December 13, 1939. In order to induce characteristic symptoms of scurvy, all supplements of vitamin C were discontinued for these 8 animals beginning December 13, 1939. After varying intervals without vitamin C, all of these monkeys manifested typical symptoms of vitamin C depletion.

The individual weight curves of monkeys in each of the groups are shown in figure 1. It is noted that many animals distributed in all groups, except those receiving a stock diet, manifested a precipitous drop in weight about 10 weeks after the experimental diets started. This was caused in each instance by an acute attack of bloody diarrhea of undetermined etiology from which all the animals apparently made a complete recovery.

Determinations of the hemoglobin content and red and white blood cell counts were made at intervals of about 5 weeks. Blood was withdrawn for these counts between 1:00 and 2:30 p. m., prior to feeding the animals. The hemoglobin content was ascertained by

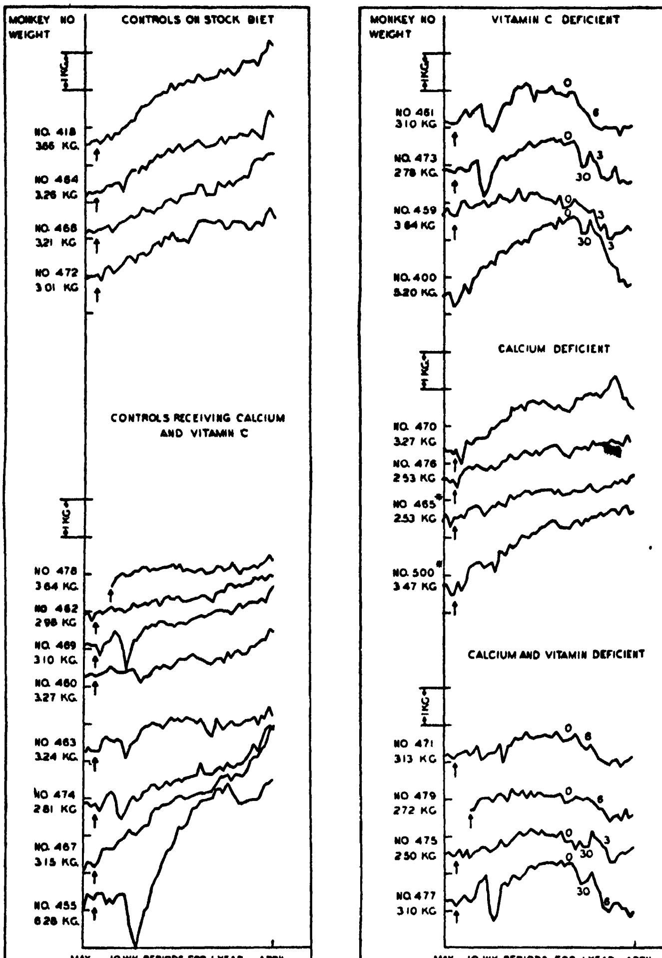

FIGURE 1.—Weight curves.

↑ = Start of experimental diet
0 = Vitamin C supplements to basal diet were discontinued.
30 = 30 mg. of vitamin C were given intramuscularly
3 or 6 = Started 3 and 6 mg doses of vitamin C for treating advanced symptoms of deficiency.
* = These 2 animals were continued for an additional 7 months on calcium deficient diet.

the Newcomer method. The hemoglobin of monkey 459 which received the vitamin C deficient diet declined from 15.2 to 6.4 gm. per 100 cc. of blood during the 333 days of depletion. Monkey 473 on the same regime showed a decrease of from 14.3 to 8.6 gm. and monkey 477, on a combined deficiency of vitamin C and calcium,

showed a decrease of from 16.7 to 8.4 gm. in a similar period. No other animals showed a significant reduction of hemoglobin content.

There was a tendency for the 8 animals on a vitamin C deficiency diet, either alone or combined with a calcium deficiency, to show lower white blood cell counts than comparable controls or animals ingesting natural foods. The average white blood cell count of the 8 vitamin C deficient animals at the beginning of the experiment was 16,600 and 11 months later it was 12,800.

There was no evidence that any of the deficiencies tested significantly reduced the red blood cell count.

TABLE 3.—*Calcium content of femurs and blood serum determinations of calcium, total protein, albumin, globulin ratio and nonprotein nitrogen* [1]

Diet No	Diet deficiency	Monkey No	Age, mos [4]	Percent calcium in femurs based on [2]—			Blood serum content of—			
				Volume cleaned bone	Weight ether ext bone	Weight of ash	Ca mg, [3] per cent	Protein, gm, per cent	Albumin globulin, ratio	N P N
516	None (stock diet)	464	35	20.1	22.3	38.4	11.2	7.57	2.24	48
		472	33	20.8	22.9	38.5	12.9	7.25	2.08	30
	Average			20.5	22.6	38.5	12.1	7.41	2.16	39
517	None (controls)	478	38	20.8	21.8	38.0	(7)			
		469	27	18.7	22.1	38.1	12.2	8.22	2.20	47
		463	38	21.2	22.4	38.1	13.4	8.25	2.09	52
		455	43	23.8	22.9	38.5	13.3	7.65	2.14	36
	Average			21.1	22.3	38.2	18.0	8.04	2.14	45
518	Calcium deficient	[5] 470	37	16.6	20.5	37.5	7.6	8.75	1.50	34
		[5] 476	27	10.5	18.3	38.2	9.1	7.85	1.97	37
		[6] 465	33	9.9	17.8	37.6	5.0			
		[6] 500	37	7.5	15.2	37.1	5.5			
	Average			11.1	18.0	37.6	6.8	8.30	1.74	36
519	Vitamin C deficient	461	35	14.5	22.0	38.0	11.6	7.16	.74	43
		473	27	12.5	21.1	38.0	12.7	6.[illegible]0	.90	53
		459	49	20.0	22.8	38.4	11.8	8.02	.74	58
		400	47	19.9	24.1	38.3	12.4	6.67	1.37	56
	Average			16.7	22.5	38.2	12.1	7.19	.94	53
520	Calcium and vitamin C deficient	471	40	12.4	21.5	38.2	12.6	6.80	2.06	51
		479	26	10.4	20.8	37.7	11.1	7.66	1.21	37
		475	32	12.4	20.3	37.2	11.8	8.02	.74	58
		477	27	8.4	18.5	37.2				
	Average			10.9	20.3	37.6	11.8	7.49	1.34	49

[1] The calcium determinations of the femurs were made by Norman Sharpless under the direction of Lawrence T Fairhall, principal industrial toxicologist of the National Institute of Health

The blood serum determinations were made in the Biochemical Laboratory, University of Virginia, through the courtesy of Prof Alfred Chanutin

[2] Calcium of the bone was determined volumetrically as the oxalate (Sutton, F Volumetric Analysis 12th ed, J & A Churchill, Ltd, London, 1935 P 201)

[3] Calcium of the serum was determined according to Halverson and Bergeim as given in Peters and Van Slyke

[4] All values listed in this table were ascertained when the animal was sacrificed at the conclusion of the experiment The age in months, however, represents the estimated age at the start of the experiment.

[5] 11 months on calcium deficient diet

[6] 18 months on calcium deficient diet

[7] A space with no values in it indicates that no determinations were made on that animal

The calcium content of one femur from each animal examined is shown in table 3. It should be noted that the percentage of calcium based on the volume of the cleaned bone brings out the most striking differences between the groups and corresponds most satisfactorily

with the clinical course of the animal, röentgenograms of each skeleton, and the post-mortem appearance of the bones. A very marked depletion of bone calcium content occurred in the monkeys on a chronic calcium deficiency and a chronic calcium associated with a chronic vitamin C deficiency regime. There is a considerable depletion of bone calcium in the case of young monkeys in the vitamin C deficient group but not in the case of older animals in this same group.

The blood serum calcium mg. percent is shown in table 3 and it is noted that there is no appreciable reduction for any group except the chronic calcium deficient animals (*4*). Values of 5.0 and 5.5 mg. percent were obtained on two calcium deficient animals on this regime for 18 months. It is noteworthy that when the calcium deficiency was associated with a concurrent vitamin C deficiency there was no evidence of a lowering of blood serum calcium content. In the combined deficiency of calcium and vitamin C, a normal level of blood serum calcium persisted despite an extensive depletion of calcium content of the bone.

Table 3 demonstrates that none of the deficient animals suffered a significant reduction of total protein in the blood serum, even though they showed a considerable curtailment of food intake. There was, however, a significant reduction in the serum albumin content and an increase in the serum globulin fraction, resulting in reversal of the albumin to globulin ratio, particularly in the case of vitamin C deficiency.

The animals on the calcium deficiency regime displayed no symptoms for 10 months. Shortly after this, monkey 470 showed a moderately rapid decline in weight.

Monkey 465 continued on the calcium deficient regime for 488 days before manifesting a decline in weight, and for 521 days before showing symptoms of mild diarrhea, some increase in irritability, reduced activity, muscle atrophy and loss of muscle tone.

Monkey 500 continued on the calcium deficient regime for 432 days before showing a decline in weight. At this time he displayed symptoms of irritability, 1 month later anorexia, and, after 475 days, a considerable weakness of the hind legs. At the conclusion of 543 days on the calcium deficient diet he would scream and shriek when being caught in the net and would "tremble all over" while receiving an intramuscular injection of vitamin C. He was unable to walk well and would move about slowly on his rump using his arms and legs in the sitting position for locomotion. There was considerable atrophy of muscles, together with loss of muscle tone. The fur was stringy but did not pull out. His condition remained the same until he was sacrificed after 551 days on the experimental diet. The first definite symptom in this monkey was weakness of the hind legs which appeared after a year on the deficient diet.

It should be stated that monkeys 465 and 500 were transferred from Washington, D. C., to Wilson Dam, Ala., at the conclusion of 1 year. Temporarily after this they showed symptoms of decreased activity from which they recovered in a few days.

In the monkeys on a chronic deficiency of (a) vitamin C, and (b) chronic deficiency of calcium and vitamin C, there was a noteworthy delay in the onset of symptoms of vitamin C deficiency, except for one large monkey, number 400, on a vitamin C deficient diet. Monkeys were classified as having clinical scurvy if they had two or more symptoms of this disease which progressed and did not heal spontaneously. Monkey 400 weighed 5.2 kg. at the beginning of the experimental diet on May 17. He gained weight rapidly, obtaining a maximum of 7.64 kg. on December 27. After 1 month on a vitamin C intake of 3 mg. per day, this large, rapidly growing animal began to show a definite gingivitis. One week later the gingivitis was associated with hemorrhage. Since this condition persisted or progressed, together with other symptoms, until the monkey was treated with vitamin C, the condition should be considered as scurvy which began about 5 weeks after the start of the experimental diet.

The three other animals on diet 519, which provides a low vitamin C intake, developed scurvy 21, 21, and 44 days after the cessation of vitamin C supplements.

The four animals on diet 520, which is deficient in both calcium and vitamin C, developed scurvy after 21, 29, 29, and 44 days following the discontinuance of vitamin C supplements.

The outstanding symptoms of the vitamin C deficient monkeys may be reviewed briefly. The animals developed hemorrhagic gingivitis, hemorrhage about the eyes including retrobulbar hemorrhage, loss of weight, dryness of skin, and rough appearance of the fur, which shed readily and in many animals could be pulled out by the handful. The young animals showed extensive bone and joint pathology with complete obliteration of the epiphyseal line by impaction of the epiphysis on the diaphysis with ankylosis of the knee joint in many animals. These bony changes crippled them greatly and none of the younger animals could walk when symptoms advanced. There was progressive muscular atrophy and loss of muscle tone in all vitamin C deficient animals. There was no evidence of aggravation of vitamin C deficiency by superimposing a calcium deficiency upon it. In fact, the incipient symptoms of vitamin C deficiency appeared to be delayed in the animals suffering from vitamin C and calcium deficiency combined.

DISCUSSION

For the purpose of orientation it may be stated that the life span of the *Macacus rhesus* monkey approximates ten times that of the rat

(*5*) and one-third that of man (*1*). Hence 11 months on a low intake of calcium and vitamin C could be interpolated to approximately 33 months in the life cycle of man, and the 18 months during which two animals remained on the extremely low calcium intake would be analogous to 4½ years in the case of man. It should be remembered that these monkeys from the point of view of chronological age of man were from 6½ to 12 years old when they started the experiment and that 22 of them were observed for approximately 3 man-years or during a rapid growth phase which included the period of puberty in many instances.

In this connection it is interesting to observe that Boelter and Greenberg (*6*) noted a decline in the weight curve of young rats receiving approximately 10 mg. of calcium per 100 gm. of diet after about 49 days. Interpolated to monkey days this is equivalent to 490 days and is consistent with the results herein reported. Boelter and Greenberg (*7*) observed that the calcium content of the blood serum of the rat decreased to around 5 mg. per 100 cc. after about 8 weeks. Theoretically comparable findings should occur in the monkey after about 560 days. Actually two monkeys after 547 days on a low calcium diet showed values of 5 and 5 5 mg. per 100 cc. of blood. Values definitely higher than these were observed at the conclusion of 330 days in two other animals. In agreement with Boelter and Greenberg's (*6*) observations in rats, monkeys showed no tetany despite low blood calcium content, and the hemoglobin content was not affected by calcium deprivation Rats on parallel calcium deficient diets likewise showed as their outstanding symptoms, weakness, muscle atrophy, loss of activity and, finally, paralysis of the hind legs Gross hemorrhage of the internal organs was not observed in the case of calcium deficient monkeys or rats such as is described by Aron and Sebauer (*8*), Martin (*9*), and Boelter and Greenberg (*6*) in dogs and rats.

Respecting vitamin C all the animals on this chronic deficiency regime very uniformly resisted weight loss until they had been on the diet for an average of 224 days (fig. 1). Apparently definite weight loss was not precipitated until vitamin C supplements had been discontinued entirely. It would appear from the data on vitamin C supplements, computed from table 1, that an average dose of 1.96 mg. per day for 208 days was sufficient to protect 7 growing monkeys weighing 3.64 kg. or less from typical symptoms of scurvy under the conditions of this experiment. These animals then developed scurvy after a minimum of 21 days and a maximum of 44 days or an average of 28 days when vitamin C supplements were discontinued. One monkey (400), weighing 5.2 kg., developed

symptoms of scurvy but nevertheless maintained a rapid rate of growth on an average of 1.96 mg. per day for a period of 208 days.

SUMMARY

The influence of a chronic deficiency of calcium, vitamin C, and a combined deficiency of these dietary components has been studied in young monkeys.

Symptoms of calcium depletion appear after about 1 year on a diet containing 10.2 mg. per 100 gm. of diet. They consist of loss of weight, weakness, muscular atrophy, irritability, decreased activity, and a paralysis of the hind legs developed in one animal. The bones of all monkeys on a calcium deficient diet showed a very low calcium content. The bones of two young monkeys on a vitamin C deficient diet showed a low calcium content as compared with two older animals in the same group.

The conspicuous symptoms of chronic vitamin C depletion observed in the monkeys of this experiment are: Anorexia, loss of weight, loss of hair, hemorrhage of the gingiva and other tissues, inability to walk because of extensive joint hemorrhage, and finally ankylosis of knee joints.

There was no evidence that a chronic deficiency of both calcium and vitamin C influenced the course of these animals other than what might be anticipated from an addition of their individual effects.

ACKNOWLEDGMENT

The writer is indebted to the Health and Safety Department of the Tennessee Valley Authority for laboratory facilities during a portion of this investigation.

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MOUTH LESIONS IN MONKEYS ASSOCIATED WITH A CHRONIC DEFICIENCY OF (1) CALCIUM, (2) VITAMIN C, AND (3) BOTH CALCIUM AND VITAMIN C[1 2]

By H. F. Fraser, *Passed Assistant Surgeon*, and N. H. Topping, *Passed Assistant Surgeon, United States Public Health Service*

Fraser[3] has described in detail the experimental diets and clinical course of 24 monkeys which were placed on control diets, a chronic deficiency of calcium, vitamin C, and a deficiency of both calcium and vitamin C. Tomlinson[4] is reporting the histopathology in these animals. This includes microscopic sections of the mandible, maxilla, teeth, gingiva, and associated tissues.

The purpose of this paper is to present in detail observations made on the mouths of these 24 monkeys. Twenty-two animals were maintained for 11 months on complete control diets and diets partially deficient in calcium or vitamin C, as well as diets deficient in both of these dietary essentials. Since none of the animals in the calcium deficient group showed any symptoms after 11 months on this regime, 2 of them, Nos. 465 and 500, were continued for an additional 7 months on this diet.

The individual protocol of each monkey is presented in table 1.

Photographs were taken of the mouths of all the monkeys before the experimental diets were begun, after 239 days on the various diets, and directly following the sacrifice of each animal. These photographs were carefully reviewed in evaluating the clinical progression of the lesions, and particularly in weighing the severity of lesions at death.

Since it is impracticable to publish the series of photographs for each animal, typical examples have been selected of the mouths of two normal animals following 11 months on the control diet and other pictures demonstrating additional types of lesions (as listed in table 1) observed at death. These photographs are presented in figures 1 to 6, inclusive, and illustrate the descriptive terms employed.

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[1] From the Division of Chemotherapy and the Division of Infectious Diseases, National Institute of Health.

[2] N. H. Topping and H. F. Fraser (Pub. Health Rep. 54: 416 (1939)) and T. H. Tomlinson (Pub. Health Rep. 54: 431 (1939)) have presented the symptomatology and histopathology of mouth lesions in monkeys acutely deprived of vitamins A, C, D, nicotinic acid, and riboflavin. The former report summarized the pertinent literature respecting gingivitis, periodontal disease, stomatitis, and noma in both experimental animals and man.

[3] The preceding article of this issue.

[4] This report will be published in the Public Health Reports, Vol. 57, No. 17 (July 3, 1941).

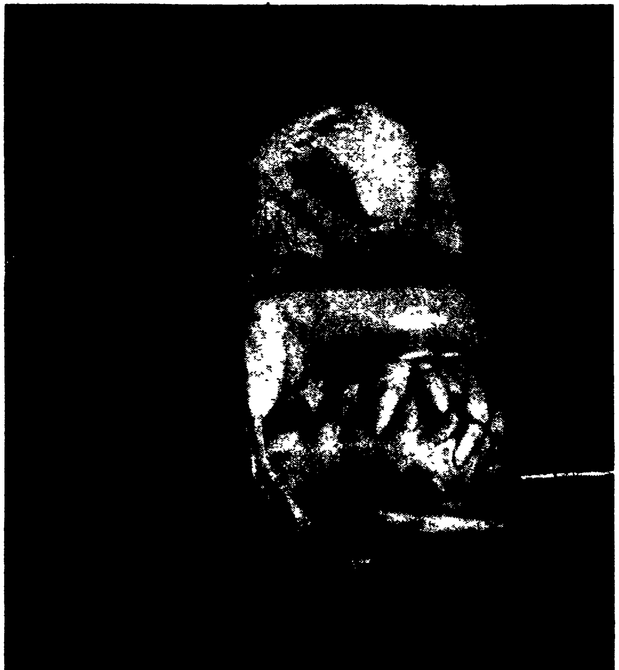

FIGURE 1.—Post-mortem photograph of monkey 463, illustrating normal gingiva and mucosa (control diet 517).

FIGURE 2.—Post-mortem photograph of monkey 455, illustrating normal gingiva and mucosa (control diet 517).

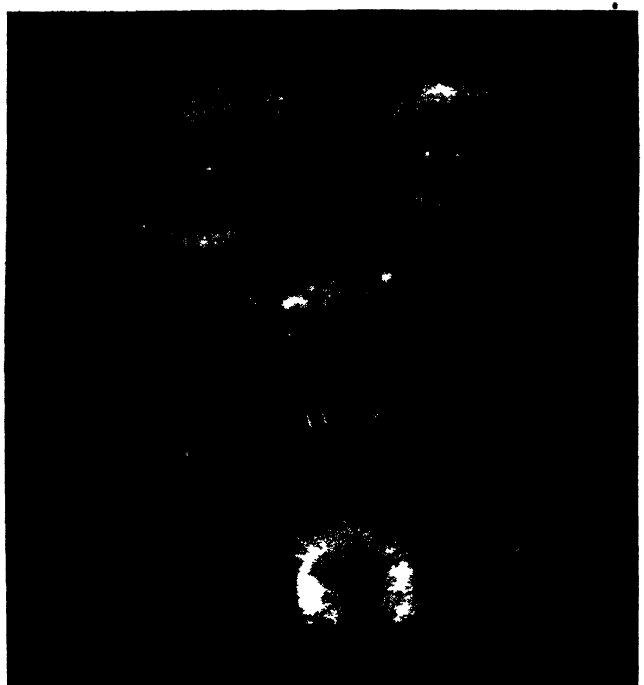

FIGURE 3 —Post mortem photograph of monkey 459, illustrating 3+ inflammation, 4+ localized recession, 3+ deposit of food and debris 3+ hemorrhagic gingivitis 4+ necrosis of interdental papillae, and 3+ necrotic gingivitis (vitamin C deficient diet)

FIGURE 4 —Post mortem photograph of monkey 400, illustrating 4+ inflammation 4+ localized recession 4+ deposit of food and debris, 4+ hemorrhagic gingivitis 4+ necrosis of interdental papillae, and 4+ necrotic gingivitis (vitamin C deficient diet)

FIGURE 5.—Post-mortem photograph of monkey 461, illustrating 4+ inflammation, 4+ localized recession, 3+ deposit of food and debris, 4+ hemorrhagic gingivitis, 4+ necrosis of interdental papillae, and 4+ necrotic gingivitis (vitamin C deficient diet)

FIGURE 6.—Post mortem photograph of monkey 477, illustrating 2+ inflammation, 2+ localized recession, 1+ deposit of food and debris, 2+ hemorrhagic gingivitis, 2+ necrosis of interdental papillae, and 1+ necrotic gingivitis (calcium deficient and vitamin C deficient diet)

TABLE 1.—*Summarization of pertinent data*

Diet number	Vitamin or mineral deficiency	Monkey number	Sex	Estimated age in months at beginning of experiment	Numbers of days before mouth lesions developed	Description of mouth lesions when first noted	Progress of lesions and response to treatment	Description of mouth lesions at termination of experiments [3]: Inflammation	Localized recession	Deposits of food and debris	Hemorrhagic gingivitis	Necrosis of interdental papillae	Necrotic gingivitis
[1] 516	None (controls)	418	0	39	0	None	None	0	0	0	0	0	0
		464	0	35	216	Unabsorbed tooth root associated with small draining sinus	Recovery in 14 days	0	0	0	0	0	0
		468	0	40	0	None	None	0	0	0	0	0	0
		472	0	33	0	do	do	0	0	0	0	0	0
[2] 517	None (controls)	478	0	38	1	Repeated trauma with hemorrhage of gums from capturing with net	do	0	0	0	0	0	0
		462	0	39	0	None	do	0	0	0	0	0	0
		469	0	27	0	do	do	0	0	0	0	0	0
		460	0	32	0	do	do	0	0	0	0	0	0
		463	0	38	15	Slight localized gingivitis at start of experimental diet period	Gingivitis and hemorrhage After loss of deciduous teeth in affected areas all symptoms subsided	0	0	0	0	0	0
		474	0	27	139	Slight gingivitis and debris accumulation about left upper second molar	Moderate gingivitis with some hemorrhage which localized to upper second molar area.	1	1	1	0	0	0
		467	0	35	0	None	None	0	0	0	0	0	0
		455	0	43	0	do	do	0	0	0	0	0	0
518	Calcium deficient	470	0	37	1	Trauma upper premolar area bilaterally	Injected upper premolar area and some collection of debris—subsided	0	0	0	0	0	0
		476	0	27	176	Abscess of gum at site of deciduous tooth which failed to shed	Recovery	0	0	0	0	0	0
		465	0	33	543	Moderate redness of gingival margin and 2+ accumulation of food and debris	Redness of gingiva generalized with hemorrhage	1	1	2	1	0	0
		500	0	37	0	None	None	0	0	0	0	0	0

See footnote at end of table

TABLE 1.—*Summarization of pertinent data*—Continued

Diet number	Vitamin or mineral deficiency	Monkey number	Sex	Estimated age in months at beginning of experiment	Numbers of days before mouth lesions developed	Description of mouth lesions when first noted	Progress of lesions and response to treatment	Description of mouth lesions at termination of experiments [3]					
								Inflammation	Localized recession	Deposits of food and debris	Hemorrhagic gingivitis	Necrosis of inter-dental papillae	Necrotic gingivitis
519	Vitamin C deficient	461	0	35	20	Very slight gingivitis and accumulation of debris in left upper molar area at start of experimental diet period	Progressive with remissions —Gums finally projected as large flaps of spongy bleeding hemorrhagic tissue which separated at attachment Moderately foul mouth odor Moderate improvement to 3 or 6 mg of vitamin C and repeated relapse following cessation of therapy	4	4	3	4	4	4
		473	0	27	27	Very slight gingivitis with tendency to hemorrhage	Redness, gingivitis, some hemorrhage, after stopping vitamin C on Dec 13, 1939, some separation of gingival attachment with impaction of food and debris in these gingival pockets Foul mouth odor Definite improvement after 30 mg of vitamin C, repeated relapse following cessation of therapy	3	2	2	3	2	2
		459	0	49	48	Very slight gingivitis about central and lateral incisors	Early symptoms subsided and did not recur until completely deprived of vitamin C, then animal developed extensive redness, swelling, inflammation, hemorrhage, and retraction of gums from gingival attachment Foul mouth odor Some reduction of symptoms following 3 or 6 mg of vitamin C	3	4	3	3	4	3
		400	0	47	27	Collection of debris and a faint line of redness at gingival margin	Rapidly progressive redness, generalized gingivitis, hemorrhage, accumulation of food and debris about all teeth, separation of gingival attachment, gradual loss of gingival tissue by necrosis and foul odor of mouth Definite reduction of inflammation and hemorrhage following 30 mg of vitamin C No evidence of repair or replacement of necrotic tissue following therapy	4	4	4	4	4	4

520	Calcium and vitamin C deficient	471	0	40	231	Gums show reddish purple discoloration and slight hemorrhage	No definite gingivitis for 231 days or 3 weeks after vitamin C supplements were stopped entirely, then gums developed a moderate degree of redness, gingivitis, and hemorrhage with localized separation of gingival detachment	2	2	1	1	1	1
		479	0	26	208	Localized redness and accumulation of food and debris	Gradually progressive redness, hemorrhage, soft and spongy gums gradual loss of interdental papillae and separation of gingival attachment, accumulation of food and debris Some improvement after 3 or 6 mg of vitamin C, repeated relapse following cessation of therapy	4	4	3	4	4	4
		475	0	32	63	Redness with slight tendency to hemorrhage at gingival margin	First lesions subsided after 3 weeks and did not recur for 4 months Then showed inflammation, hemorrhage, partial loss of interdental papillae and some separation of gingival attachment Very definite improvement of all symptoms after 30 mg of vitamin C except no replacement of necrotic interdental papillae Chronic course on 3 or 6 mg of vitamin C which was given as symptoms developed	2	3	2	0	2	1
		477	0	27	238	Slight redness and localized hemorrhage	No definite symptoms for 238 days or 4 weeks after vitamin C supplements were stopped entirely Then localized redness and hemorrhage which completely subsided after giving 30 mg of vitamin C Gums very resistant to depletion of vitamin C Chronic course on 3 or 6 mg of vitamin C as symptoms developed	2	2	1	2	2	1

[1] Diet 516 is composed of natural foods

[2] Diet 517 is composed of processed foods low in calcium and containing no vitamin C. It is supplemented by calcium in the salt xture and intramuscular injections of vitamin C

[3] 0=none, 1=slight, 2=mild, 3=moderate, 4=severe.

DISCUSSION OF TABLE

General.—Observing table 1 as a whole it is at once obvious that the 12 control animals on stock diet 519 and control diet 517 showed no evidence of gingivitis or peridontal disease except for a localized process in one monkey. Likewise, 3 out of 4 animals on the calcium deficient diet revealed no indication that this deficiency had adversely affected their mouth tissues. One animal after 15 months on the calcium deficient regime developed gingivitis which progressed gradually but the lesions were not extensive even after 18 months on this diet. In contrast to the above animals, all of those on the vitamin C deficient diet, either alone or combined with a calcium deficiency, manifested extensive lesions of the mouth.

It should be noted in table 1 that there was a considerable delay in the initial appearance of mouth lesions in the animals on the combined deficiency of calcium and vitamin C as compared with those on a vitamin C deficient diet only. In addition, the mouth pathology after 11 months appeared to be more extensive in the group on a vitamin C deficient diet as compared with those on a combined deficiency of vitamin C and calcium.

Influence of vitamin C therapy.—Four monkeys, Nos. 473, 400, 475, and 477, developed relatively advanced symptoms of gingivitis and peridontal disease after all supplements of vitamin C were discontinued from their diet. Each was then given 30 mg. of vitamin C by intramuscular injection. In each instance there was a dramatic improvement of such symptoms as gingivitis with hemorrhage, accumulation of food and debris, and a foul mouth odor. There was, however, no replacement of necrotic interdental papilla, and if there had been a separation of the gingival tissue from its attachment, creating pockets, there was little or no tendency for these to be corrected by therapy.

Small doses of 3 or 6 mg. of vitamin C would consistently improve the general condition of the animal as well as the mouth lesions, but in every instance there would be a prompt relapse following cessation of therapy.

If gingival scurvy lesions in monkeys have advanced only to the stage of inflammation and hemorrhage, specific therapy will generally arrest the condition promptly and restore normal tissues. But if the lesions advance to the stage of necrosis, many changes occur in the gingiva and peridontal tissue which do not respond to therapy and should be considered irreversible in this respect.[5]

[5] The observations in this experiment regarding therapy of vitamin C in monkeys confirm those made by Topping and Fraser in a preliminary experiment using 8 animals.

SUMMARY AND CONCLUSIONS

1. *Macacus rhesus* monkeys maintained for 11 months on a stock diet of natural foods and on a control diet of processed foods showed little or no evidence of gingivitis or peridontal disease.

2. Only one out of four comparable animals maintained on a calcium deficient diet showed a tendency toward these diseases.

3. Monkeys chronically depleted of vitamin C or chronically depleted of both vitamin C and calcium developed extensive lesions of the gingiva and peridontal tissues. If this proceeded only to the stage of inflammation and hemorrhage of the gingiva, vitamin C therapy caused prompt arrest of symptoms and restoration of the tissues to normal. A continuation, however, of the condition to the stage of necrosis of the gingiva induced many lesions which did not respond to vitamin C therapy and were, therefore, irreversible in this respect.

4. There was no evidence from these experiments that a combination of chronic calcium and vitamin C depletion provoked any mouth symptoms which could not have been caused by vitamin C deprivation alone.

NATIONAL HEALTH SURVEY

LIST OF PUBLICATIONS—CORRECTION

In the list of publications presenting the reports of studies undertaken by the National Health Survey, published in the PUBLIC HEALTH REPORTS for May 29, 1942, pages 834–841, the following reports were inadvertently omitted under the heading "General Illness Findings," on page 834:

The National Health Survey—Some general findings as to disease, accidents, and impairments in urban areas. Rollo H. Britten, Selwyn D. Collins, and James S. Fitzgerald. Pub. Health Rep., 55:444–470 (1940) Reprint No. 2143.[1]

The prevalence of disabling illness among male and female workers and housewives David E. Hailman Pub. Health Bull. No. 260, 1941.[1]

INCIDENCE OF HOSPITALIZATION, MAY 1942

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 8,000,000 members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service and it is believed that the admission rate per 1,000 reflects rather accurately the prevalence of serious illness among

[1] Obtainable from U. S. Public Health Service, Bethesda, Md., as long as supply is available (order by number where possible).

the members. The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	May	
	1942	1941
1 Number of plans supplying data	61	45
2 Number of persons eligible for hospital care	7,885,482	5,137,943
3 Number of persons admitted for hospital care	67,846	44,929
4 Incidence per 1,000 persons, annual rate, during current month (daily rate x 365)	101 2	102 9
5 Simple average of annual rates for the 12 months ended May 30	106 9	

DEATHS DURING WEEK ENDED JUNE 13, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended June 13 1942	Corresponding weekly 1941
Data from 86 large cities of the United States		
Total deaths	7,974	7,690
Average for 3 prior years	7,681	
Total deaths, first 23 weeks of year	199,992	202,603
Deaths per 1,000 population, first 23 weeks of year, annual rate	12.3	12 4
Deaths under 1 year of age	[illegible]	499
Average for 3 prior years	487	
Deaths under 1 year of age, first 23 weeks of year	12,755	11,787
Data from industrial insurance companies		
Policies in force	64,975 834	64,445,165
Number of death claims	10,861	11,685
Death claims per 1,000 policies in force, annual rate	8 7	9 5
Death claims per 1,000 policies, first 23 weeks of year, annual rate	9 9	10 3

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JUNE 20, 1942

Summary

For the country as a whole, the incidence of the common communicable diseases continues low, with only measles and meningococcus meningitis above the 5-year (1937–41) median expectancy. The cumulative death rate for 88 large cities in the United States to date this year is slightly below that for the corresponding period last year.

The number of cases of meningococcus meningitis declined during the current week from 75 to 64, with more than one-half of the cases (38) reported from the Middle and South Atlantic areas, which have been reporting the largest numbers of cases this year.

A total of 28 cases of smallpox was reported, as compared with 7 for the preceding week. Of the current total, 10 cases occurred in Illinois, of which 9 were in Cook County.[1]

Of 435 cases of bacillary dysentery, 382 cases were reported in Texas, and of 57 cases of amebic dysentery, 44 occurred in that State. Virginia reported 101 of the total of 136 cases of unspecified dysentery.

Other reports for the current week include 1 case of anthrax each in New Jersey and Pennsylvania, 1 case of leprosy in Tennessee, 18 cases of Rocky Mountain spotted fever (7 in the northwestern States), 32 cases of tularemia, and 70 cases of endemic typhus fever, of which 30 were in Texas, 17 in Georgia, and 11 in Florida.

During May, 8 cases of psittacosis were reported in New York, of which 5 cases occurred in New York City.

The death rate for the current week for 88 large cities in the United States is 10.8 per 1,000 population, as compared with 11.3 for the preceding week and a 3-year (1939–41) average of 10.7. The cumulative rate to date (first 24 weeks), is 12.2, as compared with 12.4 for the corresponding period last year.

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[1] See p. 980.

Telegraphic morbidity reports from State health officers for the week ended June 20, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	June 20, 1942	June 21, 1941		June 20, 1942	June 21, 1941		June 20, 1942	June 21, 1941		June 20, 1942	June 21, 1941	
NEW ENG.												
Maine	1	0	0	—	—	—	54	111	81	0	0	0
New Hampshire	0	0	0	—	—	—	8	3	33	0	0	0
Vermont	0	0	0	—	—	—	171	47	47	0	0	0
Massachusetts	0	3	2	—	—	—	851	759	759	2	4	1
Rhode Island	3	0	0	—	—	—	130	1	26	1	0	0
Connecticut	0	0	1	—	2	1	233	422	72	0	0	0
MID. ATL.												
New York	17	13	13	—	—	6	985	1,830	1,511	11	6	4
New Jersey	0	4	8	2	2	3	529	986	787	6	1	1
Pennsylvania	3	9	14	8	—	—	377	2,379	1,408	4	0	7
E. NO. CEN.												
Ohio	2	15	13	9	3	7	138	1,280	898	1	4	1
Indiana	2	3	3	1	3	2	58	218	97	0	0	1
Illinois	21	25	25	7	6	9	148	598	427	8	1	1
Michigan [3]	7	4	4	—	—	1	285	960	508	0	0	1
Wisconsin	1	4	2	[1]3	28	11	996	1,222	954	0	0	0
W. NO. CEN.												
Minnesota	0	0	1	—	—	1	496	16	65	0	0	0
Iowa	0	1	2	—	1	1	159	126	126	0	0	1
Missouri	1	1	5	—	—	2	67	238	50	3	1	0
North Dakota	1	0	1	—	2	1	17	13	5	0	0	0
South Dakota	0	1	0	—	—	—	28	2	3	0	0	0
Nebraska	0	1	1	—	—	—	84	6	17	0	0	0
Kansas	1	7	4	—	—	1	112	152	152	1	0	0
SO. ATL.												
Delaware	0	0	0	—	—	—	4	24	5	0	0	0
Maryland [3]	5	4	2	1	4	2	116	366	120	7	3	0
Dist. of Col.	1	1	1	—	—	—	47	111	93	0	1	1
Virginia	3	8	7	75	16	16	93	528	298	6	2	2
West Virginia	2	9	3	1	2	8	12	296	75	0	1	1
North Carolina	4	7	7	1	1	1	251	719	288	2	1	1
South Carolina	6	0	3	118	111	110	59	270	49	0	0	0
Georgia	3	7	2	10	27	2	30	196	60	1	9	0
Florida	3	2	6	1	9	—	80	50	32	1	1	0
E. SO. CEN.												
Kentucky	1	2	4	—	—	5	35	246	102	1	1	1
Tennessee	1	3	3	10	15	15	62	178	161	1	0	0
Alabama	1	1	5	40	9	8	44	89	76	2	0	1
Mississippi [3]	6	3	3	—	—	—	—	—	—	0	1	0
W. SO. CEN.												
Arkansas	3	2	3	5	7	8	37	156	31	0	0	1
Louisiana	5	1	5	2	2	10	25	3	10	2	0	1
Oklahoma	2	3	2	4	10	10	45	84	69	0	0	0
Texas	21	23	26	168	273	138	327	303	303	4	2	1
MOUNTAIN												
Montana	1	1	0	1	1	—	70	9	49	1	0	0
Idaho	0	0	0	—	—	—	12	8	18	0	0	0
Wyoming	0	4	0	61	—	—	80	5	8	0	0	0
Colorado	10	7	7	20	12	1	123	108	56	0	0	0
New Mexico	0	1	2	—	—	—	8	82	62	0	0	0
Arizona	1	2	2	24	47	21	38	81	16	0	0	0
Utah [3]	0	0	0	—	1	—	537	43	92	0	0	0
Nevada	0	0	—	—	—	—	10	0	—	0	0	—
PACIFIC												
Washington	2	0	2	1	—	—	645	12	54	1	0	0
Oregon	2	1	1	12	4	7	116	38	49	0	3	0
California	11	18	21	40	842	110	3,648	477	477	3	3	2
Total	154	196	217	630	1,440	641	12,480	15,851	9,210	64	45	45
24 weeks	6,051	6,093	9,773	77,305	483,897	156,636	435,636	781,146	322,064	1,855	1,144	1,144

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended June 20, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis, Week ended—June 20, 1942	Poliomyelitis, Week ended—June 21, 1941	Poliomyelitis, Median 1937-41	Scarlet fever, Week ended—June 20, 1942	Scarlet fever, Week ended—June 21, 1941	Scarlet fever, Median 1937-41	Smallpox, Week ended—June 20, 1942	Smallpox, Week ended—June 21, 1941	Smallpox, Median 1937-41	Typhoid and paratyphoid fever, Week ended—June 20, 1942	Typhoid and paratyphoid fever, Week ended—June 21, 1941	Typhoid and paratyphoid fever, Median 1937-41
NEW ENG.												
Maine	0	0	0	8	3	6	0	0	0	0	0	0
New Hampshire	0	0	0	3	2	2	0	0	0	0	0	0
Vermont	0	1	0	4	2	4	0	0	0	0	3	1
Massachusetts	0	0	1	162	139	137	0	0	0	2	4	1
Rhode Island	1	0	0	9	5	5	0	0	0	1	1	1
Connecticut	0	1	0	17	29	36	0	0	0	0	2	2
MID ATL												
New York	3	0	2	137	316	328	0	0	0	5	11	9
New Jersey	3	1	0	66	132	101	0	0	0	0	2	0
Pennsylvania	2	1	1	121	172	172	0	0	0	9	7	8
E NO CEN.												
Ohio	0	3	1	95	131	131	2	0	2	4	4	5
Indiana	0	0	0	17	24	46	5	0	4	0	4	3
Illinois	1	7	1	64	156	255	[3] 10	5	12	7	7	7
Michigan [3]	0	1	1	129	242	242	0	0	1	0	4	4
Wisconsin	0	0	0	73	54	67	0	1	1	1	0	1
W NO CEN												
Minnesota	2	2	0	24	23	29	1	0	2	0	0	0
Iowa	0	0	0	14	14	40	1	2	12	2	2	2
Missouri	1	0	1	22	30	30	1	0	8	5	0	7
North Dakota	0	0	0	3	1	10	0	0	3	0	0	0
South Dakota	0	1	0	5	2	7	0	0	3	0	1	0
Nebraska	0	0	0	5	9	9	0	0	1	0	0	0
Kansas	1	0	0	26	18	25	2	0	5	1	0	2
SO ATL												
Delaware	1	0	0	5	6	4	0	0	0	0	0	0
Maryland [3]	[4] 1	0	0	13	29	19	0	0	0	1	0	2
Dist of Col	0	0	0	2	6	6	0	0	0	1	0	0
Virginia	2	0	0	11	7	7	0	0	0	3	1	8
West Virginia	0	2	0	8	17	20	0	0	0	7	3	3
North Carolina	0	1	1	11	13	18	0	0	0	4	3	5
South Carolina	1	3	0	1	2	1	0	0	0	2	6	6
Georgia	1	9	1	5	8	6	0	0	0	12	15	17
Florida	1	15	0	1	4	4	0	0	0	0	2	2
E SO CEN												
Kentucky	2	1	1	23	42	24	0	3	2	2	3	9
Tennessee	0	0	0	17	15	15	2	2	0	3	9	10
Alabama	1	3	3	7	4	5	0	0	0	5	3	9
Mississippi [3]	0	4	3	4	1	4	0	0	0	0	2	2
W SO CEN												
Arkansas	3	0	0	7	2	4	1	0	1	10	10	10
Louisiana	2	1	1	3	6	6	0	0	0	7	11	11
Oklahoma	0	1	1	2	3	8	1	0	1	3	4	11
Texas	2	2	2	18	14	23	1	0	5	16	12	28
MOUNTAIN												
Montana	1	0	0	6	12	8	0	0	0	2	2	2
Idaho	0	0	0	0	1	6	0	1	1	0	1	1
Wyoming	0	1	0	7	4	3	0	0	0	0	0	0
Colorado	0	0	0	8	10	17	1	0	2	0	0	2
New Mexico	2	0	0	4	5	14	0	0	0	0	1	1
Arizona	0	1	0	5	3	3	0	2	0	0	3	3
Utah [3]	2	0	0	8	2	12	0	0	0	0	0	0
Nevada	0	0	-----	0	0	-----	0	0	-----	0	0	-----
PACIFIC												
Washington	0	0	0	21	10	22	0	1	1	0	0	2
Oregon	0	0	0	1	7	12	0	1	2	0	1	1
California	2	7	7	73	112	112	0	1	14	3	6	7
Total	38	69	65	1,275	1,849	1,890	28	19	180	118	150	254
24 weeks	514	592	592	82,084	82,726	107,943	542	1,044	7,078	2,057	2,182	3,069

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended June 20, 1942—Continued

Division and State	Whooping cough, Week ended— June 20, 1942	Whooping cough, Week ended— June 21, 1941	Week ended June 20, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	22	22	0	0	0	0	0	0	0	0	0
New Hampshire	5	2	0	0	0	0	0	0	0	0	0
Vermont	78	21	0	0	0	0	0	0	0	0	0
Massachusetts	268	188	0	0	1	0	0	0	0	0	0
Rhode Island	20	20	0	0	0	0	0	0	0	0	0
Connecticut	102	49	0	0	0	0	0	0	0	0	0
MID. ATL.											
New York	446	283	0	0	12	0	0	0	0	0	0
New Jersey	453	90	1	0	0	0	0	0	1	0	0
Pennsylvania	198	250	1	0	0	0	0	0	0	0	0
E. NO. CEN.											
Ohio	172	330	0	1	0	0	0	0	0	0	0
Indiana	37	13	0	0	0	0	0	0	0	0	0
Illinois	232	102	0	0	1	0	1	0	2	0	0
Michigan [2]	169	0	0	1	4	0	1	0	0	0	0
Wisconsin	207	123	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	25	70	0	2	0	0	0	0	0	0	0
Iowa	12	24	0	0	0	0	0	0	2	0	0
Missouri	8	12	0	0	0	2	0	0	1	0	0
North Dakota	2	16	0	0	0	0	2	0	0	1	0
South Dakota	2	1	0	0	0	0	0	0	0	0	0
Nebraska	11	6	0	0	0	0	0	0	0	0	0
Kansas	33	156	0	0	0	0	0	0	0	1	0
SO. ATL.											
Delaware	1	7	0	0	0	0	0	0	0	0	0
Maryland [3]	64	75	0	0	0	1	0	0	2	0	0
Dist. of Col.	17	10	0	0	0	0	0	0	1	0	0
Virginia	97	103	0	0	0	101	0	0	1	0	0
West Virginia	18	55	0	0	0	0	0	0	0	0	0
North Carolina	168	155	0	0	0	0	0	0	0	0	1
South Carolina	66	168	0	0	0	0	0	0	0	0	1
Georgia	29	23	0	2	16	0	0	0	0	0	17
Florida	11	10	0	1	1	0	0	0	0	1	11
E. SO. CEN.											
Kentucky	48	52	0	0	9	0	0	0	0	2	0
Tennessee	28	78	0	0	0	11	0	1	0	3	0
Alabama	53	40	0	0	0	0	0	0	0	0	5
Mississippi [3]	0		0	0	0	0	0	0	1	2	1
W. SO. CEN.											
Arkansas	17	51	0	1	2	0	0	0	0	6	0
Louisiana	9	16	0	2	0	0	0	0	0	1	4
Oklahoma	10	12	0	0	0	0	1	0	0	0	0
Texas	201	361	0	44	382	0	3	0	0	1	30
MOUNTAIN											
Montana	16	31	0	0	0	0	0	0	3	6	0
Idaho	1	18	0	0	0	0	0	0	0	0	0
Wyoming	2	5	0	3	0	0	0	0	2	3	0
Colorado	25	162	0	0	0	0	0	0	0	0	0
New Mexico	18	16	0	0	0	0	0	0	0	0	0
Arizona	11	55	0	0	0	21	0	0	0	0	0
Utah [3]	28	87	0	0	0	0	0	0	0	5	0
Nevada	4	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	40	61	0	0	0	0	0	0	0	0	0
Oregon	29	18	0	0	0	0	0	0	2	0	0
California	208	658	0	0	7	0	0	0	0	0	0
Total	3,721	4,105	2	57	435	136	8	1	18	32	70
24 weeks	91,802	111,93									

[1] New York City only.
[2] See p. 980.
[3] Period ended earlier than Saturday.
[4] Onset in January.

PLAGUE INFECTION IN THE UNITED STATES DURING MARCH AND APRIL 1942

Extensive surveys by field units of the Public Health Service engaged in plague suppressive measures were begun in the western States early in March of this year. Especial attention will be directed to military reservations and air fields. The surveys will include the area between the Mexican and Canadian borders approximately between longitudes 100° and 124°. It is planned to survey all military reservations within that area and to institute control work where indicated, as well as around air fields at Spokane, Washington, and Boise, Idaho.

Four States now have field units engaged in collecting specimens of rodent tissue and ectoparasites, as follows: Oregon, 2; Washington, 1; Idaho, 1; and Montana, 1. The U. S. Public Health Service Laboratory in San Francisco examines all specimens submitted by these units.

The following delayed reports of plague infection found during March and April 1942 have recently been received:

CALIFORNIA

Lassen County: April 22, tissue from ground squirrel, *C. oregonus*, 9 miles southeast of Amedee; pool of 20 fleas from 19 ground squirrels, *C. townsendi*, same location.

Monterey County: Camp Hunter Liggett Military Reservation, King City, March 20, pool of 13 fleas from 7 mice, *Peromyscus truei*, near Bradley Road; March 21 pool, of 15 fleas from rabbit, *Sylvilagus bachmani*, near Bradley Road. April 28, tissue from ground squirrel, *C. beecheyi*, west of San Antonio River in Lugo Canyon; pool of 42 fleas from 14 wood rats, *Neotoma fuscipes*, in same locality; pool of 132 fleas from ground squirrel, *C. beecheyi*, in same locality.

San Luis Obispo County: April 24, pool of 198 fleas from 10 ground squirrels, *C. beecheyi*, ranch 3½ miles east of Santa Margarita.

Santa Barbara County: April 29, pool of 27 fleas from ground squirrel, *C. beecheyi*, Alamo Creek, 10 miles east of Santa Maria.

OREGON

Jackson County: March 21, pool of 77 fleas from 8 ground squirrels, *C. douglasii*, Little Butte Creek area 17–19 miles northeast of Medford. March 24, pool of 199 fleas from 17 ground squirrels, *C. douglasii*, Applegate Valley, 4 to 9 miles south of Ruch, on the Copper Road.

Josephine County: March 23 pool of 213 fleas from 12 ground squirrels, *C. douglasii*, Deer Creek Valley, 2½ to 4 miles east of Selma.

Klamath County: April 29, pool of fleas from ground squirrel, *C. oregonus*, Sprague River, 36 to 38 miles east of Klamath Falls, on Route No. 66.

Union County: April 30, pool of 35 fleas and 5 lice from ground squirrels, *C. oregonus*, and a pool of 20 fleas from ground squirrels, same species, from ranches 1 to 5 miles west of North Powder.

TULAREMIA INFECTION IN MUSKRATS

Under date of April 14, 1942, the U. S. Public Health Service Laboratory at San Francisco, California, reported the finding of *Bacterium* (*Pasteurella*) *tularense* infection in two muskrats (*Ondatra zibethica* sp.) taken at Klamath Lake, Klamath County, Oregon. Infection was proved bacteriologically and microscopically, and by animal inoculation.

This finding is of especial interest, not only because of the fact that the infection had not previously been demonstrated in the tissues of muskrats, but also in view of the fact that Klamath Lake has been seeded with these animals for purposes of fur production.

SMALLPOX IN COOK COUNTY, ILL.

A case of smallpox was admitted to the Cook County Hospital on June 13, 1942. The diagnosis was confirmed by Dr. A. Hoyne, of the Chicago Board of Health. The case originated in the suburbs of Chicago, and a subsequent investigation, conducted by Dr. E. A. Piszczek, of the Cook County Public Health Unit, revealed eight other cases.

A general program of vaccination is being conducted in the county area where the cases occurred.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 6, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	2	0	4	0	2	0	5	0	1	2
Baltimore, Md	4	0	------	0	88	4	5	0	27	0	3	36•
Barre, Vt	0	0	------	0	0	0	0	0	0	0	0	4
Billings, Mont	0	0	------	0	7	0	1	0	0	0	0	1
Birmingham, Ala	0	0	2	0	3	0	0	0	3	0	0	13
Boise, Idaho	0	0	--	0	2	0	0	0	1	0	0	0
Boston, Mass	2	0	------	0	316	2	7	1	78	0	0	50
Bridgeport, Conn	0	1	1	0	6	0	0	0	8	0	0	2
Brunswick, Ga	0	0	------	0	10	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	------	1	21	1	4	0	10	0	0	2
Camden, N. J	0	0	------	0	1	0	5	0	15	0	0	3
Charleston, S. C	0	0	2	1	5	0	0	0	0	0	1	3
Charleston, W. Va	0	0	------	0	0	0	0	0	0	0	0	0
Chicago, Ill	14	0	3	3	31	0	29	0	58	0	0	119
Cincinnati, Ohio	1	0	------	0	4	0	1	0	19	0	0	12
Cleveland, Ohio	0	1	2	1	8	0	8	0	55	0	0	33
Columbus, Ohio	0	0	1	1	42	0	3	0	3	0	0	11
Concord, N. H	0	0	------	0	0	0	0	0	0	0	0	0
Cumberland, Md	0	0	------	0	0	0	1	0	0	0	0	0
Denver, Colo	6	0	11	0	177	0	9	0	6	0	0	14
Detroit, Mich	2	0	1	0	38	0	6	0	119	0	0	96
Duluth, Minn	0	0	------	0	9	0	2	0	5	0	0	0
Fall River, Mass	2	0	------	0	18	0	0	0	19	0	0	0
Fargo, N. Dak	0	1	------	0	0	0	0	0	0	0	0	1

City reports for week ended June 6, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Flint, Mich	0	0	------	0	1	0	6	0	2	0	0	5
Fort Wayne, Ind	0	0	------	0	0	0	2	0	1	0	0	3
Frederick, Md	0	0	------	0	0	0	0	0	0	0	0	0
Galveston, Texas	0	0	------	0	3	0	1	0	0	0	0	10
Grand Rapids, Mich	0	0	------	0	1	0	3	0	3	0	0	6
Great Falls, Mont	0	0	------	0	23	0	1	0	1	0	0	2
Hartford, Conn	0	0	------	0	64	0	2	0	0	0	0	16
Helena, Mont	0	0	------	0	2	0	1	0	0	0	0	1
Houston, Texas	1	0	------	0	12	0	7	0	0	0	3	1
Indianapolis, Ind	0	0	------	0	80	0	6	0	17	0	0	33
Kansas City, Mo	2	0	------	0	58	0	8	0	19	0	1	0
Kenosha, Wisc	0	0	------	0	6	0	0	0	1	0	0	14
Little Rock, Ark	0	0	------	0	4	0	1	0	0	0	0	0
Los Angeles, Calif	6	0	1	0	417	1	11	0	17	0	0	20
Lynchburg, Va	1	0	------	0	1	0	0	0	0	0	0	43
Memphis, Tenn	0	0	------	1	46	0	2	0	4	0	0	6
Milwaukee, Wis	0	0	------	0	446	0	2	0	25	0	0	63
Minneapolis, Minn	1	0	------	0	169	0	2	1	6	0	0	11
Missoula, Mont	0	0	------	0	10	0	0	0	0	0	0	1
Mobile, Ala	0	0	------	0	0	0	1	1	1	0	0	0
Nashville, Tenn	0	0	------	1	9	0	1	0	0	0	0	8
Newark, N. J	0	0	1	0	190	1	5	0	13	0	0	59
New Haven, Conn	0	0	------	0	36	0	0	0	1	0	0	8
New Orleans, La	0	0	1	0	28	0	12	2	3	0	2	2
New York, N. Y	8	0	9	1	124	13	39	0	151	0	2	184
Omaha, Nebr	0	0	------	0	53	0	1	0	2	0	0	0
Philadelphia, Pa	2	0	------	0	43	3	21	0	112	0	2	134
Pittsburgh, Pa	1	0	------	0	11	1	5	0	11	0	1	15
Portland, Me	0	0	------	0	41	2	0	1	3	0	0	0
Providence, R. I	0	0	------	0	163	0	3	0	4	0	0	18
Pueblo, Colo	0	0	------	0	0	0	0	0	0	0	0	1
Racine, Wis	0	0	------	0	154	0	0	0	10	0	0	25
Raleigh, N. C	0	0	------	0	5	0	0	0	1	0	0	6
Reading, Pa	0	0	------	0	2	0	0	0	1	0	0	9
Richmond, Va	0	0	------	0	5	0	1	0	1	0	0	0
Roanoke, Va	0	0	------	0	0	0	0	0	0	0	0	0
Rochester, N. Y	0	0	------	1	8	1	4	0	4	0	0	5
Sacramento, Calif	2	1	------	0	34	0	2	0	5	0	0	29
Saint Joseph, Mo	0	0	------	0	0	1	0	0	0	0	0	0
Saint Louis, Mo	0	0	1	0	49	0	7	0	15	0	3	5
Saint Paul, Minn	0	0	------	0	77	0	3	0	3	0	0	18
Salt Lake City, Utah	0	0	------	0	309	0	2	0	2	0	1	7
San Antonio, Tex	0	0	------	0	9	0	1	0	0	0	0	1
San Francisco, Calif	0	0	------	0	136	1	6	0	7	0	0	0
Savannah, Ga	0	0	------	0	3	0	0	0	0	0	0	4
Seattle, Wash	0	0	------	1	249	0	3	0	4	0	0	8
Shreveport, La	1	0	------	0	2	0	1	0	0	0	0	0
South Bend, Ind	0	0	------	0	0	0	0	0	3	0	0	3
Spokane, Wash	0	0	------	0	91	0	1	0	3	0	0	2
Springfield, Ill	0	0	------	0	17	0	1	0	2	0	0	0
Springfield, Mass	0	0	------	0	56	0	0	0	16	0	0	5
Superior, Wis	0	0	------	0	0	0	0	0	0	0	0	0
Syracuse, N. Y	0	0	------	0	500	1	2	0	4	0	0	24
Tacoma, Wash	1	0	------	0	0	0	1	0	0	0	0	6
Tampa, Fla	0	0	------	0	12	0	1	0	0	0	0	2
Terre Haute, Ind	1	0	------	0	1	0	1	0	1	0	0	0
Topeka, Kans	0	0	------	0	14	0	2	0	1	0	0	5
Trenton, N. J	0	0	------	0	0	0	0	0	6	0	0	5
Washington, D. C	1	0	------	0	59	1	9	0	4	0	1	21
Wheeling, W. Va	0	0	------	0	3	0	1	0	0	0	0	1
Wichita, Kans	0	0	------	0	63	0	2	0	5	0	0	5
Wilmington, Del	0	0	------	0	5	0	1	0	4	0	0	0
Wilmington, N. C	0	0	------	0	2	0	2	0	1	0	0	11
Winston-Salem, N. C	0	0	------	0	7	0	1	0	1	0	0	0
Worcester, Mass	0	0	------	0	0	0	5	0	13	0	0	43

Anthrax.—Cases: Camden, 1.
Dysentery, amebic.—Cases: St. Louis, 1.
Dysentery, bacillary.—Cases: Los Angeles, 1; Springfield, 1.
Typhus fever.—Cases: New York, 2; Savannah, 2.

Rates (annual basis) per 100,000 population, for the group of 89 cities in the preceding table (estimated population, 1942, 33,831,758)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended June 6, 1942	9 09	5 55	1 85	723 15	44 08	143 49	0 00	3 24	199 90
Average for week, 1937-41	13 70	7 32	3 11	[1] 608 91	55 28	211 80	2 02	4 20	190 93

[1] Median.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—A rat found on May 16, 1942, in Kapulena area and one rat found on May 19, 1942, in Paauhau area, Hamakua District, Island of Hawaii, T. H., have been proved positive for plague.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended May 23, 1942.—During the week ended May 23, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		1		1	3	1			3	9
Chickenpox		7		124	258	14	14	2	108	527
Diphtheria		19	2	23	2	8	5	3		62
German measles		1		16	39	4	16	8	20	104
Influenza		12			9	1			8	30
Lethargic encephalitis						1				1
Measles		1		336	170	131	27	10	34	709
Mumps		33	3	108	361	64	189	30	319	1,107
Pneumonia		2			12	2	2		9	27
Poliomyelitis						2				2
Scarlet fever	1	17	20	89	168	27	30	53	30	435
Trachoma						1				1
Tuberculosis	2	6	11	90	67		3		27	206
Typhoid fever				31	3		5			39
Undulant fever					1				1	2
Whooping cough		1	2	157	78	2		4	56	300
Other communicable diseases		6		4	277	30	4		6	327

FRENCH WEST AFRICA

Cerebrospinal meningitis.—In 1941, there were 2,244 cases of cerebrospinal meningitis in French West Africa, with 606 deaths, of which 1,567 cases and 449 deaths occurred during the first quarter. During the first quarter of 1942, 1,047 cases and 354 deaths occurred.

Past experience shows that in French West Africa this disease makes its appearance in January and reaches a peak late in February or early in March. It is thus most prevalent during the dry season. The disease declines as the year advances, reaching a low during the third and fourth quarters. So far in 1942, the disease has been most prevalent in the French Sudan, Ivory Coast Colony, and Senegal.

NEW ZEALAND

Notifiable diseases—4 weeks ended March 23, 1942.—During the 4 weeks ended March 23, 1942, certain notifiable diseases were reported in New Zealand as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	34	1	Puerperal fever	4	
Diphtheria	71	2	Scarlet fever	40	
Dysentery (bacillary)	14	1	Tetanus	1	
Erysipelas	27	2	Trachoma	1	
Lead poisoning	1		Tuberculosis	154	41
Ophthalmia neonatorum	2		Typhoid fever	30	1
Poliomyelitis	4				

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January–March 1942	April 1942	May 1942—week ended— 2	9	16	23	30
ASIA								
Ceylon	C	31	30	3				
India	C	1,946	7,463					
Calcutta	C	181	165					
Chittagong	C	30	6					
Rangoon	C	1						
India (French)	C	1						

PLAGUE

[C indicates cases; P, present]

Place		January–March 1942	April 1942	May 1942—week ended— 2	9	16	23	30
AFRICA								
Basutoland	C	7						
British East Africa.								
Kenya	C	308						
Nairobi	C	62						
Uganda	C	123						
Madagascar	C	64	14					[1] 6
Morocco	C	113	26	8	17	8	35	25
Union of South Africa	C	31	10					
ASIA								
China[2]								
India	C	385						
Indochina (French)	C	54	13					[1] 3
Palestine: Haifa	C	4						
SOUTH AMERICA								
Argentina: Cordoba Province	C	7						
Brazil:								
Alagoas State	C	3						
Pernambuco State	C	6						
Chile: Valparaiso	C	1						
Peru:								
Ancash Department	C	6						
Lambayeque Department	C	3						
Libertad Department	C	6						
Salaverry—Plague infected rats		P						
Lima Department	C	28	8					
Piura Department	C	7	6					
OCEANIA								
Hawaii Territory: Plague-infected rats		16	1					

[1] For the month of May.

[2] Plague has been reported in China as follows: Chekiang Province, Apr. 1–10, 1942, 4 cases; Fukien Province, Jan. 1–Apr. 5, 1942, plague appeared in 11 localities; Hunan Province, week ended Apr. 18, 1942, 2 cases; Suiyuan Province, pneumonic plague appeared in epidemic form during the period Jan. 1–Apr. 4, in the northwestern area.

SMALLPOX

[C indicates cases]

Place		January-March 1942	April 1942	May 1942—week ended— 2	9	16	23	30
AFRICA								
Algeria	C	326	68				[1] 56	
Belgian Congo	C	249						
British East Africa Tanganyika	C	3						
Dahomey	C	40	12					
French Guinea	C	59	8					
Ivory Coast	C	50						
Morocco	C	899	151	13	20	22	34	12
Nigeria	C	537	335	88	104			
Niger Territory	C	237	200					
Senegal	C	9						
Tunisia	C	1						
Union of South Africa	C	464						
ASIA								
Ceylon	C	3	1					
China	C	7						1
India	C	9,551	2,872					
Indochina (French)	C	1,292	615					[2] 494
Iran	C	28						
Iraq	C	164	12			7		
EUROPE								
France:								
Seine Department	C	41		2		1		
Unoccupied zone	C	13						
Portugal	C	24	3			6		
Spain	C	48	28	4		6		
NORTH AMERICA								
Canada	C	1	1					
Mexico	C	9						
SOUTH AMERICA								
British Guiana	C	1						
Colombia	C	126						
Venezuela (alastrim)	C	84						

[1] For the period May 1-20.
[2] For the month of May

TYPHUS FEVER

[C indicates cases; P, present]

AFRICA								
Algeria	C	16,329	7,009				[1] 3,740	
Basutoland	C	15						
British East Africa Kenya	C	4						
Egypt	C	7,654	[2] 953					
Ivory Coast	C	4						
Morocco	C	9,179	5,783	1,119	1,021	1,001	1,050	879
Niger Territory	C	1						
Sierra Leone	C	1						
Tunisia	C	7,303	2,797	721	485	580		
Union of South Africa	C	362						
ASIA								
China	C	7						
India	C	5	1					
Iran	C	129	131					
Iraq	C	6	8		8			
Palestine	C	16	3					
Syria	C	22						
EUROPE								
Bulgaria	C	291	114	57	43			
Czechoslovakia	C	5						
France.								
Seine Department	C	1						
Unoccupied zone	C	45	79		2		6	2
Germany	C	85						
Hungary	C	358	143	23		35		
Irish Free State	C	2	1					

[1] For the period May 1-20.
[2] For 1 week.

TYPHUS FEVER—Continued

[C indicatec cases; P, present]

Place		January-March 1942	April 1942	May 1942—week ended— 2	9	16	23	30
EUROPE—continued								
Portugal	C		1					
Rumania	C	2,068	434	140	94	141	96	104
Spain	C	3,349	265	46	70			
Canary Islands	C	1						
Turkey	C	193	P	P	P	P	P	P
Union of Soviet Socialist Republics	C	66						
NORTH AMERICA								
Guatemala	C	34	10					
Jamaica	C	10	4					
Mexico	C	197	2					
Panama Canal Zone	C	1						
Puerto Rico	C	3						
SOUTH AMERICA								
Chile	C	16	7	6				
Ecuador	C	14						
Venezuela	C	7						
OCEANIA								
Australia	C	12	1					
Hawaii Territory	C	20	1			2		

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January-March 1942	April 1942	May 1942—week ended— 2	9	16	23	30
AFRICA								
Belgian Congo: Libenge	D		1					
French West Africa	C	1						
Gold Coast	C	1						
Ivory Coats	C	1		[1] 1				
Senegal [2]								
Sierra Leone: Freetown	C	2						
Sudan (French)	D	[1] 1						
Togo: Hohoe	C	1						
SOUTH AMERICA [3]								
Brazil: Acre Territory	D	4						
Colombia:								
Boyaca Department	D	2						
Intendencia of Meta	D	1						
Santander Department	D	1						

[1] Suspected.
[2] According to information dated Feb. 9, 1942, 15 deaths from yellow fever among Europeans have occurred in Senegal.
[3] All yellow fever in South America is of the jungle type unless otherwise specified.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY *Assistant Surgeon General, Chief of Division*

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